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AUTHOR Markley, O. W.
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ABSTRACT

This is the first volume of a report on a study that (1) investigated the "normative structure" (the governance system) of knowledge production and utilization (KPU) activities in education, (2) developed an analytical framework through which to understand how formal policy acts as a "regulator" of activities in KPU, (3) described major policies of significance to KPU and how they influence the governance of KPU processes in 10 different, representative case studies, and (4) made recommendations that would help in the design of a monitoring program. This volume of the report describes the conduct of the study, the methodological framework that was developed, and the recommendations that were inferred. It also contains an annotated bibliography of various topics covered by the study. Appended are a bibliographic essay of general systems theory and KPU in education, and a discussion of KPU as an educational system. (RC)

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THE NORMATIVE STRUCTURE
OF KNOWLEDGE PRODUCTION AND UTILIZATION IN EDUCATION

VOLUME I A METHODOLOGY FOR DESCRIBING THE INFRASTRUCTURE OF EDUCATIONAL R&D

Research Report
EPRC 3555-13

Prepared for:

NATIONAL INSTITUTE OF EDUCATION
DEPARTMENT OF HEALTH, EDUCATION
AND WELFARE
WASHINGTON, D.C.

CONTRACT NIE-C-74-0133

EDUCATIONAL POLICY RESEARCH CENTER

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EDUCATION & WELFARE
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94025

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A Policy Research Report is an official document of the Educational Policy Research Center. It presents results of work directed toward specific research objectives. The report is a comprehensive treatment of the objectives, scope, methodology, data, analyses, and conclusions, and presents the background, practical significance, and technical information required for a complete and full understanding of the research activity. The report is designed to be directly useful to educational policy makers.

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RESEARCH NOTE

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STANFORD RESEARCH INSTITUTE
Menlo Park, California 94025 · U.S.A.

SRI Project 3555

December 1975

Educational Policy Research Center

O. W. MARKLEY
Principal Investigator

Research Report

EPRC 3555-13

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PREFACE

This is one of two volumes constituting the final report of an 18-month study entitled "The Normative Structure of Knowledge Production and Utilization in Education," performed by Stanford Research Institute under contract to the National Institute of Education (NIE). Reports and working papers produced as part of this study include:

- O. W. Markley, "The Normative Structure of Knowledge Production and Utilization: Interim Report" (December 1974).
- T. Mandel, "Development and Application of the Analytical Framework" (December 1974).
- R. Prewitt, "Functional Subsystems for Curriculum Reform" (December 1974).
- A. Zink, "Use of Mind or Behavior Modifying Techniques in Education" (December 1974).

The central objective of the study was to develop an analytical framework for describing the governance system that influences knowledge production and utilization (KPU) activities in education. In this volume we describe the analytical framework, explain how it was developed, and discuss its implications for a research and development (R&D) monitoring program.

The second volume demonstrates the use of the analytic framework and describes the substantive findings that resulted when the framework was applied to ten different case study topics. The titles of these ten topics are:

I. National Institute of Education (NIE) Allocation Policy

II. Federal Procurement Policy and Knowledge Production and Utilization in Education

III. Assessing the Impact of Policies that Control the Availability of Information

IV. The Far West Laboratory as a Research and Development Performer

V. Minicourses as an Example of Policies Affecting the Dissemination/Utilization of a Successful R&D Product

VI. The School Mathematics Study Group (SMSG) Project as an Example of Policies Affecting the Dissemination/Utilization of an R&D Product

VII. ESEA Title III Teacher Initiated Innovation Program: An Example of Policies Interfacing Levels of Government

VIII. The Governance of Knowledge Production and Utilization in Intermediate Service Agencies: Boards of Cooperative Educational Services in Colorado and New York

IX. Policies Affecting the Results of the Federally Sponsored Pilot State Dissemination Program in South Carolina: 1970-73

X. An Approach to Monitoring the Role of Government Policies in the Process for Selection and Evaluation of New Instructional Materials

This study is one of a series sponsored by NIE's R&D Systems Support Division in response to the recommendations of exploratory position papers such as "Building Capacity for Renewal and Reform" (Task Force on Resources Planning and Analysis, 1973) and "Modelling a National Educational R&D System" (Churchill, 1974). Under the direction of Dr. Ward Mason, the R&D Systems Support Division has responded to NIE's legislative mandate to help build an effective R&D system in education by pursuing three interrelated goals:

1. To develop a monitoring system that will lead to a systematic data base concerning educational knowledge production and utilization.

2. To initiate a series of studies that will:

   a. Develop models of the educational KPU process that lead to a greater understanding of applied system dynamics;

b. Assess the status of the R&D system, the educational system, and the changes occurring in those systems;

c. Identify problems and areas of weakness or imbalance in the educational KPU system for which NIE support activities are needed;

d. Be useful to NIE policymakers, to the R&D and educational communities, and to the general public.

3. To design and manage specific programs for strengthening the educational KPU system.

Related investigations supported by the R&D Systems Support Division include:

- William Paisley and associates at Stanford University, preparing the first two editions of a Databook and a separate technical report in which they will analyze existing data bases and make recommendations for the development of a more coherent system of statistical indicators regarding the status of KPU in education.
- Rolf Lemming at NIE, conducting a survey of various institutional performers of KPU in education.
- Michael Radnor at Northwestern University, studying R&D systems in such areas as agriculture, aerospace, and defense to deduce applicable principles for R&D management in education.
- David Clark and Egon Guba at Indiana University, studying the KPU-related roles of departments, schools, and colleges of education.

These studies constitute a set of preliminary "predesign" studies that should illuminate the actual design of a monitoring system at a later date.

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Thomas Thomas was the project supervisor. Acting as an advisory committee were Hendrick Gideonse, Willis Harman, Michael Kirst, Philip Sorenson, and Norman Storer. Stacy Churchill and Joseph Brunon were project consultants.

Ward Mason, project officer, and Raymond Wormwood, contracts officer, are both at the National Institute of Education (NIE). Russell Fey, contracts administrator, is at SRI.

As with other research efforts entailing the production and use of knowledge in education, many other individuals contributed their time and expertise. The willingness of all of these persons to cooperate in this project is gratefully acknowledged.

GLOSSARY

Agent	A legally responsible entity, one or more persons concerned with any phase of the KPU system, including individuals, teams of persons, and institutions that act in a relatively unitary fashion. The terms agency and actor may also be used where convenient to distinguish the institution from the institution's representative person.
Analytic framework	A conceptual structure that guides inquiry into and analysis of KPU in education.
Conceptual subsystems	Subsystems that follow from a particular way of conceptualizing the system under study.
Configuration	An image or description of a portion (or a whole) of the KPU infrastructure as developed from a particular perspective. A configuration is an arrangement of a set of features and distinctions made by an analyst who guides his inquiry with a particular purpose.
Field of analysis	The environment and ecology of the focus of analysis.
Focus of analysis	The agents, activities, policies, and resources of central concern to a specific purpose of analysis.
Functional subsystems	Subsystems that emerge empirically to accomplish a particular function in the larger system under study.
Infrastructure	The interrelated elements through which the process of knowledge production and utilization in education takes place.
KPU	The sum of innovative activities ranging from basic research to installation of new practices through which new knowledge is produced and used in education. The term is broader than simply research and development, incorporating as well the linkage of the research and development activities and the utilization of their products. Such activities as evaluation, demonstration, dissemination, diffusion,

	policy studies, or policy research are to be considered as components of the four basic KPU activity categories of research, development, linkage, and utilization.
Normative structure	The set of values and principles (both formal policies and informal norms) that guide behavior concerned with the production, dissemination, and utilization of educational knowledge.
Purposive activities	A set of actions that reflect or build toward the intent of some formal statement of goals or norms, or what we call formal policy. (See goal oriented activity.)
Resources	The matter, energy, and information needed to engage in a particular activity. Resources consumed and/or transformed by agents into other resources include money, educational products, information, individual skills, and the like.

In our discussion of Phase 2 of the project we abandoned a number of terms used in our discussion of Phase 1. We did this for the following reasons: either we could replace them with new terms that more closely describe the concept; or we did not mention the concept itself in our discussion of Phase 2.

To assist the reader in understanding the discussion of Phase 1 we list and explain these abandoned terms below. The terms have been segregated from the rest of the glossary to emphasize the fact that they have been abandoned or replaced by new terminology in the discussion of Phase 2 of the project.

Flow	The movement of resources and influences through the EKPU system.
Goal oriented Activity	Activity evaluated against and modified to serve some intent. (See purposive activity.)
Process loop	A prescribed and time-sequenced series of actions incorporating planning and evaluation and directed toward the accomplishment of an objective.

Public Policy Regulators (PPRs)	Directives that are codified and have a legal basis. Examples include statutory law, codes of ethics, certification evaluation and planning requirements, formal incentives, and budgetary priorities. Excluded from this subset are informal norms, unwritten procedural conventions, and the observed behavior patterns of regulatory agents.
Regulators	The various norms, rules, laws, procedural conventions, and observed behavioral patterns of regulatory agents that constitute the normative structure of the KPU system.
Regulatory agent	An agent responsible for establishing, changing, or implementing one regulator or a set of regulators.

SUMMARY

This project is one of several predesign studies commissioned by the National Institute of Education's R&D System Support Program to help the Institute establish design requirements for an external monitoring system it has proposed to develop. The pursuit of such a monitoring capability is in direct response to NIE's congressionally bestowed mission to "help build an effective R&D system" as well as its own recognition that "there is a great need for better data concerning the knowledge production and utilization system and the operating school system it serves .... Generally we have lacked both the data base and the understanding of system dynamics needed for effective, rational policy-making." This use of the term knowledge production and utilization (KPU) stems from the Institute's recognition that research and development is a misleadingly narrow term to apply to improvement-oriented change activities in education and that a more encompassing conception is needed to adequately legitimize the full range of activities necessary to help solve or to alleviate the problems of American education.

The central objectives of this study were to investigate the "normative structure" (the governance system) of KPU; develop an analytical framework through which to understand how formal policy acts as a "regulator" of activities in KPU; describe the major policies of significance to KPU and how they influence the governance of KPU processes in ten different case studies selected to be widely representative of KPU in education; and make recommendations that would help in the design of a monitoring program. As a whole, the effort was conceived of as an exploratory attempt to develop and test the feasibility of a systems mapping approach believed to be compatible with the concepts that NIE

proposed for use in its monitoring program. As with many systems studies, the study was designed in a recursive fashion, where the results of an initial period of inquiry were assessed and the study design was reformulated before proceeding further.

In our first approach, we sought to:

- Construct an extensive taxonomy through which all major types of agents, policies, flows, and several other regulatory influences on KPU could be classified and assigned a code for indexing purposes.
- Develop a basic master system map (to provide consistency and coherence as detailed maps of KPU subsystems were developed) showing all major agents and on which all major information, product, and resource flows could be depicted.
- Apply a variety of commonly used systems analysis tools and techniques in concert with the maps, the taxonomy, and other information in such sources as ERIC and the Databook being prepared in a parallel study to describe KPU phenomena in a way that would integrate four different modes of description:
  - Typological--a multidimensional classification of agents, policies, flows, and other aspects of KPU in education and its governance structure.
  - Graphical--a series of diagrams that reveal the static and dynamic relationships of various KPU system elements.
  - Numerical--time-series and other indicators that express the quantified attributes of the system and its parts.
  - Textual--verbal descriptions of research findings, laws, guidelines, and other information that expresses nonquantified and non-imagistic attributes of the system and its parts.

Because of the emphasis on the role of formal policies which help regulate or govern KPU, and on the role that time-series indicators might have

in monitoring KPU, the conceptual image or paradigm initially explored could be characterized as essentially that of hierarchical systems.

Regardless of how one might view the desirability of its attributes, this approach was found to be unfeasible as a framework for investigation and analysis of KPU in education. KPU is a secondary goal for most agents and institutions in the KPU infrastructure; hence the involvement of many of these agents and institutions is ad hoc or purpose specific. Unless one first specifies fairly precisely what it is one wants to know about the KPU infrastructure, efforts to map KPU as a system with various subsystems must be done either at such a high level of abstraction that the level of detail is inadequate for realistic analysis or at such a high level of concrete detail that the portrayal falls down under its own weight, given the limitations of available media. Moreover, there is not merely one perspective from which to map KPU, but many, each of which illuminates a different set of relationships underlying KPU phenomena.

We therefore revised our basic strategy and relied on our inquiry in the ten case topics to guide the development of a framework that could be used to describe various aspects of KPU as seen from various perspectives and for various purposes, rather than to test the feasibility of one that would fit any given part of KPU into an overall general map of hierarchically ordered classifications. Policies, agents, resources, and activities in KPU were the four basic terms of reference that we used as the basic building blocks in this new pursuit. As requested by NIE, we developed a finished taxonomy only for formal policies.

In pursuing this strategy we developed a flexible methodology that allows the researcher to describe the interaction of various configurations of policies, agents, and resources in the shaping of activities through which specific acts or processes of knowledge production and utilization take place. The methodology allows one to see systemic

relationships without forcing one to systematize them in an overly simplistic fashion. To do this requires that the purpose of analysis at least be tentatively established by the analyst to provide a basis on which to make distinctions and draw connections and inferences. (A first distinction the analyst makes, for example, is between the focus of his interest and its surroundings. A second distinction concerns the extent to which relationships involving parts of a given configuration, the configuration itself, or the environment of the configuration should be explored.)

From the results of our exploratory study, we judge that NIE's stated objectives for its monitoring program cannot feasibly be fulfilled by a system based on the social indicators approach. Although this approach is particularly suitable for improving understanding of some activities in some parts of the KPU infrastructure (e.g., those activities having to do with the distribution and control of fiscal resources that are highly specified by formal policy), it is particularly unsuitable for improving understanding of others (e.g., those activities relating to the actual creation and use of new knowledge that are highly discretionary in nature).

A variety of recommendations for development of the monitoring program were inferred from the findings of the project.

- NIE should consider and include a variety of conceptual viewpoints in the design of its monitoring program.
- The design of the monitoring program should be based, in part, on an explicit consideration of such definitive issues as:
  - The degree to which NIE's monitoring program will be based on any given conceptualization or paradigm as opposed to being based on a deliberate or haphazard mixture of conceptual approaches.

- The degree to which NIE will try to rigorously articulate (i.e., codesign and coordinate) its monitoring program and its other governance functions.
- The degree to which new knowledge will be conceptually limited to include only that which results from processes and/or products of the institutionalized KPU system.
- The degree to which data needs and data collection activities of other agencies (particularly at the state level) will be explicitly considered in the design of the monitoring program.

- The design of a monitoring program should, in large part, be based on the types of information about the KPU infrastructure that will actually be needed by major policy analysis activities anticipated for the next several years. Thus a policy analysis information-needs assessment should be done as an additional "predesign" study.
- The assessment of likely impacts of the Buckley Amendment on KPU is an immediate activity that well-represents a type of policy analysis that will increasingly need information about the infrastructure of KPU in the future and should be undertaken both for its own sake and as a way of concretely facing various trade-offs in the design of the monitoring program.
- As a first step in the development of time-series indicators of balance and continuity of support in KPU (as well as to provide information of vital interest to NIE's constituency), NIE should prepare cross-tabulations of its disbursements in various categories (such as mode of procurement, substantive topic, type of performer) for inclusion in subsequent editions of its Databook.

The final report of this study comprises two volumes, the first of which describes the conduct of the study as a whole, the methodological framework that was developed, and the recommendations that were inferred. This volume also contains an annotated bibliography of various topics covered by the study. The second volume demonstrates the use of the framework and describes the substantive findings that resulted when the framework was applied to the following ten case topics:

I National Institute of Education (NIE) Allocation Policy

II Federal Procurement Policy and Knowledge Production and Utilization in Education

III Assessing the Impact of Policies that Control the Availability of Information

IV The Far West Laboratory as a Research and Development Performer

V Minicourses as an Example of Policies Affecting the Dissemination/Utilization of a Successful R&D Product

VI The School Mathematics Study Group (SMSG) Project as an Example of Policies Affecting the Dissemination/Utilization of an R&D Product

VII ESEA Title III Teacher Initiated Innovation Program: An Example of Policies Interfacing Levels of Government

VIII The Governance of Knowledge Production and Utilization in Intermediate Service Agencies: Boards of Cooperative Educational Services in Colorado and New York

IX Policies Affecting the Results of the Federally Sponsored Pilot State Dissemination Program in South Carolina: 1970-73

X An Approach to Monitoring the Role of Government Policies in the Process for Selection and Evaluation of New Instructional Materials

I THE EFFORT TO MAP THE KPU SYSTEM

Overview of Section I

The National Institute of Education has been charged with the responsibility of contributing to educational knowledge production and utilization (KPU) by (among other things) helping to build an effective educational R&D system. In executing this charge NIE asked Stanford Research Institute (SRI) to develop a strategy for describing the pattern of the educational research and development (R&D) system that exists and for identifying the key regulators of that system. In response to NIE's request, SRI attempted to create an analytic framework based largely on systems mapping techniques. We drafted a highly aggregated master map of the whole educational R&D system to provide consistency and coherence as more detailed maps of KPU subsystems were produced. This approach became unmanageable, however, because we found that there is not one single perspective from which to map KPU and most of the components of KPU are first and foremost components of other systems. No agreement could be reached on what the basic subsystems of KPU really are. In fact, it became clear that KPU is not one single system, except by definition.

The Emergence of Research and Development Systems Thinking in Education

The concept of KPU was first introduced by Machlup (1962) and recently promoted as a term of reference in education by NIE (Task Force on Resources Planning and Analysis, 1973). KPU is a term meant to subsume the older term "educational research and development." The objective of this project is to develop a method for describing the infrastructure of

the KPU system in education. To understand this objective and why it is reasonable to think in terms of a KPU "system" it is useful to review briefly the development of federal involvement in educational R&D.*

Research and development conducted at federal expense for elementary and secondary education is a recent and still relatively small-scale phenomenon. For all intents and purposes we can say that federal encouragement of educational R&D had its birth in the cold war following World War II. In particular, Sputnik and the space race brought national attention to the problems of improving the schools. Following the R&D program model developed for defense and industrial efforts, the Cooperative Research Act of 1954 and the National Defense Education Act of 1958 provided support for similarly structured R&D by the U.S. Office of Education (USOE) and the National Science Foundation (NSF). Under this model, educational R&D was mainly oriented toward the development and/or improvement of educational materials.

The first educational R&D strategy adopted by NSF and USOE was that of promoting the individual creativity of professional scholars to produce and incorporate new knowledge into instructional materials.

By 1964, it was evident that the original R&D model was seriously inadequate because it focused on knowledge production and all but ignored the coordination of production activities with the needs and concerns of the user school systems. A reformulation of the "basic problem" turned attention to the fact that state and local education agency support systems did not enable teachers to obtain and use the basic educational R&D that was being produced.

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*(See Gideonse, 1970, Levien, 1973, and National Institute of Education, 1973 and 1975 for a more detailed history of federal involvement in educational R&D).

Through the Elementary and Secondary Education Act (ESEA) of 1965 a new image of educational R&D was formalized. The federal government had to deliver R&D all the way to the classroom or school; hence the research development-dissemination-adoption (RDDA) model was adopted as the ideal. Moreover, R&D was beginning to be pictured as the activity of a network of institutions including:

- Universities and colleges.
- Independent nonprofit organizations, including the regional education laboratories and centers.
- Profit-oriented organizations.
- Linkage agents like ERIC, educational publishing firms, and formal or informal networks or associations of educational professionals.
- School systems and state education agencies (SEAs).
- The schools themselves as the "operating system" for education.

Along with the growth of interest and support of R&D in education, the concept of an RDDA "system" began to arise, due in part to the success image garnered by systems analysts in the Department of Defense, in part to a feeling among educational researchers with a social engineering orientation that educational reform could be more successful if it was more systematic, and in part to other factors. These events set the stage for a rhetoric arguing that educational R&D should be viewed holistically as a system with nested subsystems, a whole range of actors, and institutions who (should) perform various, specific KPU activities that (should) articulate with each other. Expectations for educational R&D had moved into the "systems" phase (see Table 1). Thus, the conceptual expectations and institutional components for a public sector educational R&D network emerged piecemeal over two decades. Finally in 1972 Congress created NIE to coordinate federal contributions to this network. The central policy behind NIE's creation and operation was very general; it set forth four major concerns for the Institute:

1. Help to solve or to alleviate the problems of, and promote the reform and renewal of, American education.

2. Advance the practice of education, as an art, science, and profession.

3. Strengthen the scientific and technological foundation of education.

4. Build an effective education research and development system.*

Table 1

EVOLUTION OF THE FEDERAL IMAGE OF KPU: 1954-1975

Period	Perspective of KPU
1954 to 1962	Development of new knowledge by encouraging through support individual professional scholars to focus their creativity on improving instructional materials and basic methods.
1962-1965	Development of the basic elements and expectations for a KPU network. Emergence of the RDDA concept.
1965-to present	In keeping with the national shift to program governance and systems management/management by objective, the emergence of the concept of KPU as a social system encompassing improved linkage, feedback, and systems monitoring.

This brief overview shows how it happened that at its inception NIE was charged with the responsibility of viewing educational R&D as a system and helping a system mature. Unlike the areas of R&D in defense, aerospace, and agriculture, however, the goals of educational R&D are highly amorphous, its participants less easily identified, and its role

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*[Education Amendments of 1972, PL 92-318, Section 405 (a) (2)].

vis-à-vis its clients less clear. Hence, while setting immediate priorities and distributing national resources to specific educational R&D projects, NIE has continuously struggled to develop both an adequate gestalt of the scattered activities it is to help support and a method of determining how, as a whole, the nation's KPU efforts can be coordinated for a higher payoff.

In two papers, "Building Capacity for Knowledge Production and Utilization in Education" (Task Force on Resource Planning and Analysis, 1973) and "Modelling a National Educational R&D System" (Churchill, 1974), NIE inquired how best to identify the anatomy of the KPU system. In "Building Capacity," NIE argued that an essential problem afflicting KPU is a lack of understanding of the structure and process of the system (the infrastructure). It therefore was important to develop a capacity for monitoring the structure and process of the R&D system operating in the field of education. In "Modelling a National Educational R&D System," Churchill argued that developing a method of describing or mapping the anatomy of the KPU infrastructure ought to be one of the first steps in exploring the feasibility of an educational monitoring program.

Initial Orientation of Project Staff

This is a predesign study to develop a methodology for a description of the KPU infrastructure that is useful for understanding and for locating weaknesses or imbalances in the KPU governance system.

In preparing a study plan that would be responsive to NIE's requests and move one step further toward refining feasible expectations for a KPU monitor program, we set four tasks:

1. Develop a general reporting or analytic framework for systematically describing the KPU formal governance infrastructure. Include as integral to that task the development of an expandable taxonomy of public policy

categories relevant to KPU (one that could in principle reflect various informal regulatory mechanisms).

2. Select ten major "regulators" (governance mechanisms) of KPU and describe them using one common framework.*

3. Assess the validity and potential benefit of using this framework for description in a monitoring program.

4. Extract a set of recommendations and implications for the design of the monitoring program.

At the behest of NIE we limited the domain of study to present public policy regulators (PPRs) in the infrastructure of KPU activities aimed at grades K through 12. (Table 2 lists the features of PPRs of interest to NIE.)

The analytic framework was to be a descriptive method to organize effectively the collection and summarization of data on KPU as a system. The framework was to be based on a systems-oriented view of KPU and modified by the empirical properties of KPU as we observed them.† In this sense the framework would lie between the level of theory and the level of discrete empirical variables (see Figure 1). As such, the general purpose of the framework is to identify and describe the governance infrastructure of KPU--more precisely, the role of formal policy in influencing the production, dissemination, and use of new knowledge for education.

The analytic framework is not meant to stand by itself; it is conceived as a component part of NIE's overall approach to policy analysis.

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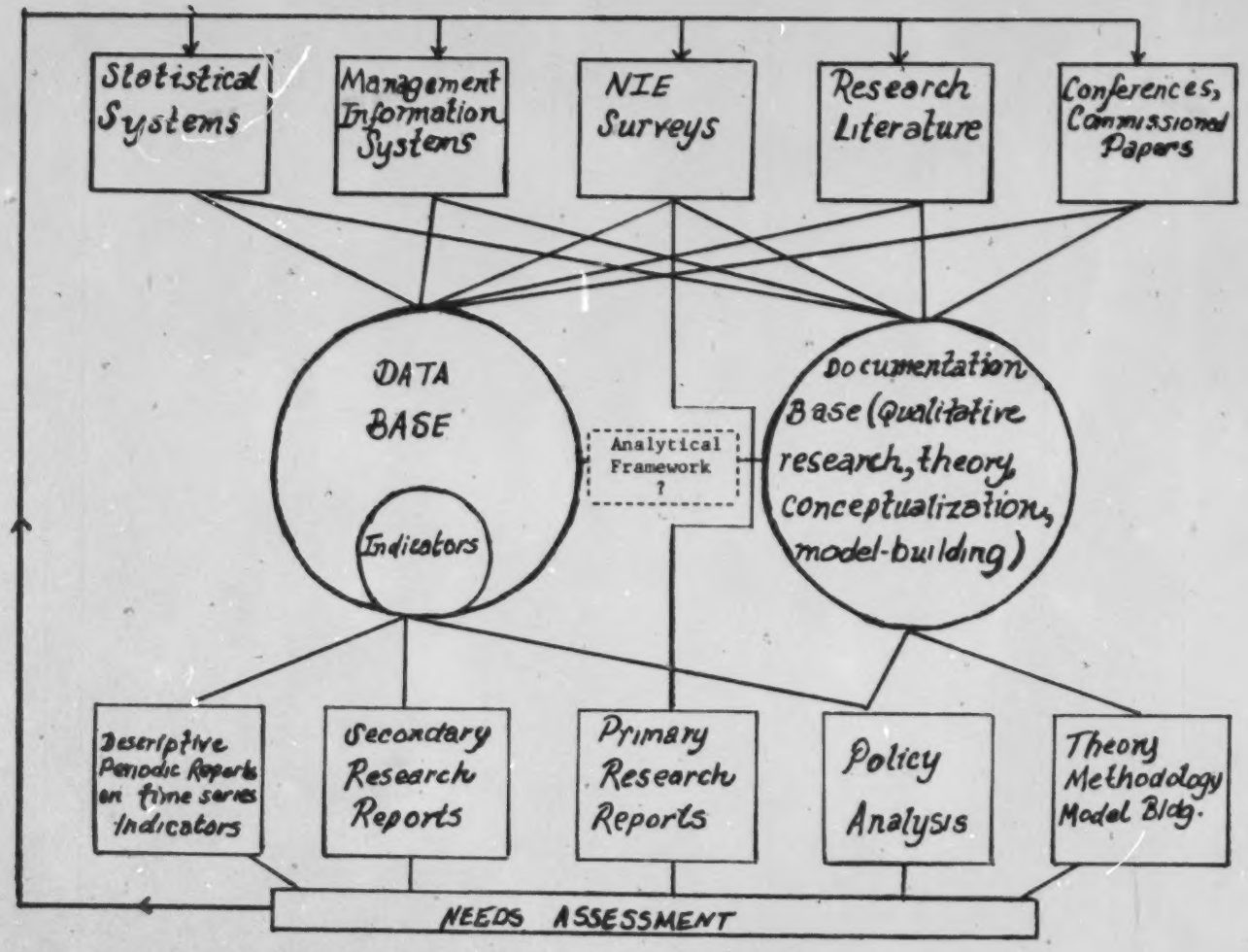
*Our basic approach was that of hierarchical systems mapping which we believed consistent with NIE's proposed social indicators approach.

†A bibliographic essay of general systems theory that summarizes the rationale for this approach is presented as Appendix B.

Table 2

A TYPOLOGY OF KPU PUBLIC POLICY REGULATORS
OF INTEREST TO NIE

Type of policy:
Statutory law
Case law
Public regulations issued by governmental bodies
Federal agency decision structures regarding the allocation and commitment of funds
Federal agency requirements regarding project monitoring, reporting, planning, and evaluation
Internal regulations or organizations involved in the creation, production, distribution, or utilization aspects of KPU (e.g., regulations of state or local educational agencies regarding adoption of textbooks or other innovations)
By-laws, guidelines, or codes of ethics that shape the KPU activities and support of professional associations and private foundations
Institutional setting or level:
Federal
State and intermediate education agencies
Local education agencies
Professional organizations and labor unions
Private foundations
Domains affected by policy:
Level of educational public for R&D (where applicable, e.g., elementary school)
Content area (e.g., curriculum development, educational television)
Position on the KPU spectrum (research, development, linkage, utilization)



Note: Box denoting analytical framework added by SRI.

Source: Dr. Ward S. Mason National Institute of Education July 25, 1974

FIGURE 1 ROLE OF THE ANALYTIC FRAMEWORK IN A MONITORING SYSTEM FOR KPU

Project Methodology: Phase 1

To meet the objectives and perform the tasks outlined in the preceding discussion, we designed the study approach shown in Figure 2.* We adopted the prevailing hypothesis that KPU is a system of research, development, linkage, and utilization as our initial conceptual orientation. The preliminary set of categories suggested in Table 2 were used to provide an orientation for the taxonomy of public policies.

From this perspective, we began our preliminary survey of the literature and interviewed a variety of actors in KPU to learn their perspectives and in particular to get their nominations for the most significant issues, types of policies, and KPU agents. We list below the most typical KPU regulators that turned up in our survey.

1. Money (amount of material and fiscal resources)
2. Stability of support
3. Concern for human subjects
   a) Regulations on the treatment of human subjects
   b) Militance of subjects and their representative organizations
   c) Minority rights
4. Styles of organization and administration of KPU performers
5. Clearance procedures
6. Publishers aversion to risk

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*The underlying assumption of our approach was that KPU is a system reasonably characterized by the logical pattern of research-development-linkage-utilization. Therefore, the metalogic of the project was that, by clarifying a systems description of KPU, we would have the common frame of reference for underpinning both a description of any sector of that system and the development of categories and classification rules for a taxonomy of PPRs of KPU.

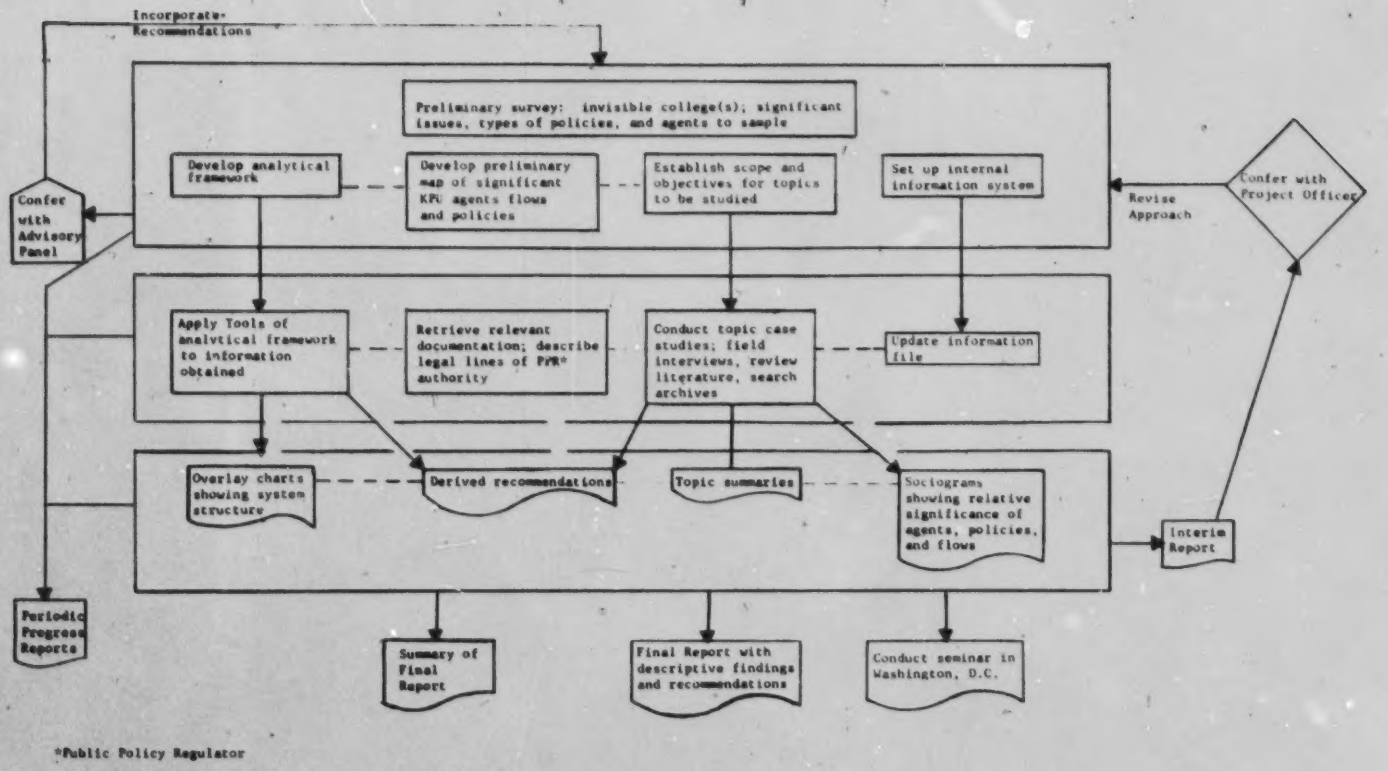
Incorporate Recommendations
Preliminary survey: invisible college(s); significant issues, types of policies, and agents to sample
Develop analytical framework
Develop preliminary map of significant KPU agents flows and policies
Establish scope and objectives for topics to be studied
Set up internal information system
Confer with Advisory Panel
Revise Approach
Confer with Project Officer
Apply Tools of analytical framework to information obtained
Retrieve relevant documentation; describe legal lines of PPR* authority
Conduct topic case studies; field interviews, review literature, search archives
Update information file
Overlay charts showing system structure
Derived recommendations
Topic summaries
Sociograms showing relative significance of agents, policies, and flows
Interim Report
Periodic Progress Reports
Summary of Final Report
Final Report with descriptive findings and recommendations
Conduct seminar in Washington, D.C.
*Public Policy Regulator

FIGURE 2 A SCHEMATIC FLOW CHART DEPICTING THE DESIGN LOGIC OF THE PROJECT

7. Weak incentives for basic education research

8. "Politics" (especially of KPU programs at the federal level)

From this survey we would complete the basic structure of the analytic framework and simultaneously develop survey protocols for interviewing KPU actors throughout the system. We would also develop preliminary maps of the infrastructure surrounding specific regulators and would make informed decisions to limit the scope of parameters that should be studied in the next two tasks (see Figure 2). In turn the results of these later tasks would be fed back into the basic analytic framework, particularly at the interim report, and necessary incremental adjustments to the framework and taxonomy would be made.

In the process of conducting the survey, we were able to further clarify what the analytic framework should be. Based on Figure 1 and our expectation of what tools would be useful to describe the range of infrastructure of KPU, we expected the analytic framework to have two principal features.

1. It should rest on an underpinning of a complete and consistent image of KPU that would allow the relations and connections of the parts of the system to be mapped and missing or overlapping connections to be identified.

2. It should provide a complete and consistent set of taxonomic principles to allow classification of the data relevant to the regulation of the KPU infrastructure.

However, because we encountered more ambiguity than anticipated in forming an overall picture of KPU, development of protocols and selection of topics proceeded at this stage without the coordination we anticipated the framework would provide.

Conference with Advisory Panel

At this point, we held a design conference with the advisory panel. Two related issues were of central concern. First, if the analytic framework was to serve as the set of principles with which to underpin that part of a monitor program that deals with the dynamic regulation of the KPU infrastructure, then what features must the framework have? Second, how might we proceed to formulate such a framework?

We decided that:

1. The analytic framework should be capable of illuminating the entire KPU infrastructure in education.
2. The KPU "system" should be mapped in such a way as to reveal potential linkages that are missing and needed as well as existing linkages. This is particularly important for operational linkages between knowledge production and knowledge utilization.
3. Policies, agents, and the flow of information and resources should be the primary categories from which to select topics to test the analytic framework. Topics should be selected to give as balanced a coverage of the spectrum of KPU activities as is feasible.

The problem of how to develop the analytic framework did not marshall a set of recommendations as specific as the expectations listed above. However, a list of somewhat eclectic orienting questions was produced, to which the framework should provide specific answers:

1. What policies influence most greatly the actions of various KPU agents and the aggregate actions of various KPU subsystems?
2. What policies tend to be ignored or overridden in practice?
3. What if any agents or areas of the KPU system in education suffer most from "policy overload" to the point of becoming dysfunctional?

4. Do any of the effects in (2) and (3) seem to occur across KPU subsystems or agents of various types (i.e., are there particular policies that seem especially significant or insignificant in terms of their actual influence throughout the system)?

5. Does the length of the timing cycle of evaluation and feedback make much difference in the effectiveness of a policy?

6. What recent changes in KPU policies have been made that influenced the behavior of KPU agents? What are the effects of such changes?

7. Are there significant omissions of particular policies that are needed as a result of recently changing context?

8. Are there in effect adequate second-order regulators (that is, regulators who control the development and persistence of other regulators, for example, education subcommittees in Congress)?

9. What policies will be either necessary or likely because of expected changes in the context of KPU in education?

The framework should also provide assistance in satisfying secondary objectives for the overall study by (1) indicating the kinds of information that should be collected on a regular or periodic basis as a part of a program for monitoring KPU, (2) providing implications for the design criteria for a monitoring system, and (3) serving as a basis for identifying special research studies to understand the operation and effects of specific policies or groups of policies in general and on specific sectors of KPU.

As a result of this first stage of effort and our meeting with the advisory panel several specific issues became evident. First, both the current literature and prevailing sentiment of the advisory panel pointed to the lower levels of the operating education system as the sector in terms of which KPU needs to be understood. Attention should be paid to KPU agents, actors, and regulators in the local education agencies (LEAs),

school sites, and classrooms. Second, KPU activities can only be explained in terms of an adequate overall picture of the KPU network and its basic dynamics. Third, because a complex endeavor like KPU is controlled by a variety of influences, the question, How influential are formal public policies? must be asked.

Each of these issues had a profound effect on how we performed the cycle through the three tasks. The LEA issue led us to focus the preliminary field work in that direction. LEA staff (particularly those engaged in installation of new practices) were the principal agents interviewed. The issue of building an analytic framework for describing the KPU infrastructure on the foundation of a sound picture of the KPU network led us to attempt to create an overall or master map of the basic subsystems of KPU to allow unambiguous identification and classification of KPU agents, activities, and policies. Finally, the issue of formal regulators of KPU led us to attempt to map the specific dynamic interactions in the KPU infrastructure and to identify and describe the most significant regulators of that interactive process using systems dynamics methods.

With this orientation the analytic framework would be the basic master map, the principal subsystem maps, and a set of tools for identifying the key elements of the map, expanding the maps, and describing or tracing the effects of changes of variables or parameters in the maps.

Developing a Concept of Public Policy Regulators of KPU

The reasonableness of attempting to create a specific overall map of KPU as a system arises from the assumption that there are in fact distinct regulators of the KPU infrastructure in a cybernetic sense, that is, specific regulatory processes or functions. Therefore at this point in our effort we attempted to clarify our concept of PPRs.

We expected that, whatever "regulators" are, the types of regulators probably vary sharply according to whatever goes through the KPU pipeline. However, behind each specific formal regulator we could expect to find one or more people acting as the agents who do the regulating. (This meant that we were looking at neither informal regulators nor highly diffuse public regulators). Gradually we put together a profile of PPRs.

Profile of Public Policy Regulators

Because of the proliferation of PPRs it is important to concentrate on only those called out specifically for study in specific cases. We must find a way to wash out or disregard those PPRs not immediately significant and simply note that they are contextual PPRs existing as part of the system but not needing to be described in detail to understand the point at hand. The remaining PPRs would be those that are significant to the system of description.

Significant PPRs will be called out by whoever is responsible for each study topic. Having located a significant PPR, the contextual PPRs should be identified and quickly examined to see if there are other significant PPRs or whether several contextual PPRs taken together become significant. The contextual PPRs should then be worked up on a contextual PPR worksheet and the significant PPRs should be worked up on a significant PPR worksheet.

Having identified and analyzed the PPRs for a given study topic or area of concern, the contextual PPRs may be given final mention and left to rest. Significant PPRs, however, might be treated in the same way as agents on the systems map. By placing each significant PPR at its place of origin on the map (by an overlay) and indicating those areas which it regulated on that map, such things as PPR "overload," "conflicting" PPRs, and the like, should be readily identifiable.

Developing a Holistic Image of KPU

The scope of the project was now limited solely to developing a strategy for describing the formal regulatory structure and dynamics controlling KPU. Therefore we assumed we would be able to map this structure without too much difficulty. We began a search of the education literature for some portrayal of the various tiers of government and how they interact to provide governance of education. Presumably such information would allow us to develop a master map of KPU in a straightforward way.

All we could find in our search, however, were general treatises on the theory of governance (e.g., Lindbloom 1968) and the specific network of actors that converged around specific legislation (e.g., Summerfield 1974). We took this as but one more indication of the immature state of the art that deals with the systems of educational governance.* Therefore we proceeded to construct our own general description of this network.

We identified concepts for inclusion in the general model to underpin the descriptions. First, KPU is clearly composed of functional subsystems, that is, networks of agents engaged in a particular activity within the wider range of KPU. For example, curriculum development is a functional subsystem. Second, KPU is understood most commonly in terms of various conceptual subsystems, that is, organizing classifications of the major KPU sectors. For example, at the extremes of the spectrum, are the knowledge production and practice support conceptual subsystems. Third, the formal regulators of KPU are clustered by the legal profession and cultural tradition into various legal subsystems. For example, federal law and state education codes are legal subsystems.

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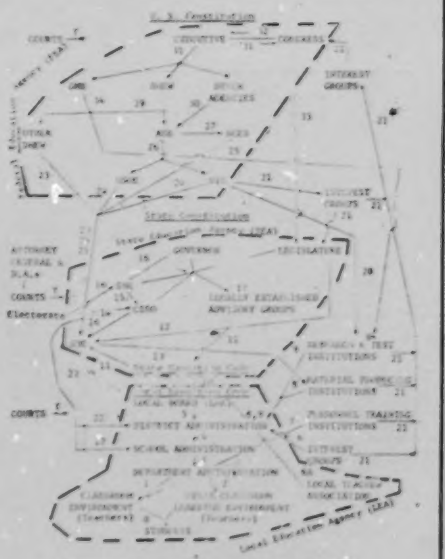
*In fact this indicates a much more fundamental problem, as we will show later in the report.

Related to how subsystems should be conceptualized, we found three additional considerations needing to be included in the framework. First, the connection or interface of social subsystems is, we found, effected through people and many of these human interfaces do not follow the main line of authority in the Weberian sense. The analytic framework must be able to be used to get down to that level of detail where the interface between subsystems is actually conducted by specific people especially when those people are at the lower levels of the organization chart operating in channels not formally designated or controlled. Second, there are likely to be "big engines" driving change through the system, such as the Sputnik-science drive and the civil rights movement. The analytic framework should be able to portray impact of these factors on the KPU infrastructure. Third, we should not expect to find all the necessary and desirable subsystem connections already existing. The framework should reflect the extent to which there are subsystems that are not well interconnected in KPU.

With these considerations in mind our problem is to create a framework involving an overall image of KPU that will allow us to identify the rules that govern the KPU infrastructure.

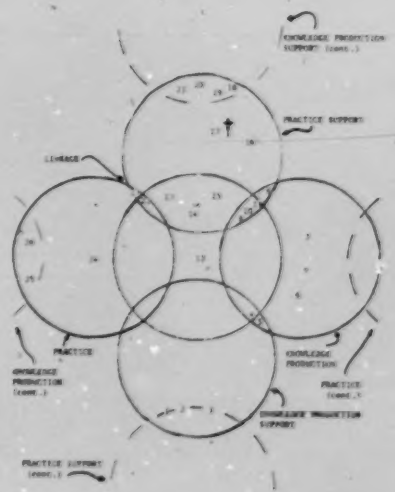
The first step in the development of an analytic framework centered on identifying all types of agents in the KPU system and noting their roles vis-à-vis two basic graphics. In one of these graphics KPU agents are sketched hierarchically according to the functional paths of information, authority, and the like that connect them (see Figure 3a). The numbers are keyed to an exhaustive table that specifies the tentative paths and generic sources of policy information marking them (see Table 3). Figure 3a is our master functional subsystems map.

The second map, Figure 3b, identifies the orientation of each agent with respect to KPU conceptual subsystems. The numbers on this map designate agents and are keyed to Table 3b. From the exercise indicated



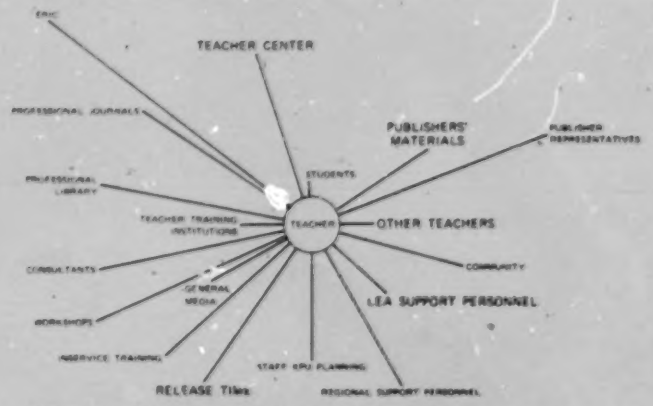
Schematic of PPRs in KPU

(a)



Conceptual Subsystems Map

(b)



Closeness of source to teacher indicates availability of resource, and boldness of lettering indicates significance of influence (for illustrative purposes only — necessary data not yet available)

An Element for a Sociometric Diagram of KPU Agents

(c)

*Numbers Designate PPRs Listed in Table 3a.
†Numbers Designate Agents Listed in Table 3b.

FIGURE 3 CONCEPTUAL DEVELOPMENT SYSTEMS

Table 3

TABLES IN SUPPORT OF FIGURE 3

(a) Regulation Matrix (PPRs Shown on Figure 3a)

	From	To	Source of PPR Authority	Control Issue
0.	Teacher	Student	State Education Code Local District Teacher's Manual School Site Regulation	Activity of student
1.	Department Administration	Teacher	State Education Code Local District Teacher's Manual School Site Regulation	Conduct of classroom
2.	Department Administration	Teacher desirous of using extra learning environment	Administrative structure; State Education Code Local District Teacher's Manual School Site Regulation	Use of environment
≀	(Complete Matrix Shown in Interim Report (Markley, 1974)			
32.	Congress	Executive	U.S. Constitution	National Education Policy Goal Setting; confirmation of nominated agency heads
33.	Congress	State legislatures	U.S. Constitution 20 U.S.C. 123a	Limitation on Federal involvement in education
34.	OMB	Materials producing institutions; research and testing institutions	Congress Executive	Conduct of surveys "OMB clearance"
Y.	Courts (all levels)	Agents chosen by litigants	U.S. Constitution State constitutions	Adjudication

(b) Agent List (Numbers Shown on Figure 3b)

Number	Agent Name	Number	Agent Name
1	Foundation program in Education (e.g., I/D/E/A)	14	Intermediate Service Agency (e.g., Teacher Center)
2	Federal Agency Program Office (e.g., NIE)	15	SDE specialists
3	Federal Agency Policy Office	16	SDE Planning Office
4	SDE Research Office	17	Regional Information Center
5	Policy Research Agency	18	Publishers
6	Basic Research Agency	19	Accrediting agencies
7	Mission/Applied Research Agency	20	Testing and evaluation research agencies (all types)
8	Development agency	21	Professional Associations
9	Professional journals	22	Local administration
10	Institutions	23	Principal
11	Personnel training	24	Student
12	Problem-solving consultants	25	Learning Center
13	Information Storage/Retrieval/Dissemination Agency (e.g., ERIC)	26	Teacher

in Figure 3b we hoped to gain a purpose-oriented perspective of KPU to understand the hierarchic authority-based approach in Figure 3a.

With these two global maps drafted, we then turned our attention to fleshing them out via study of the individual agents and policies. Figure 3c shows how we expected to be able to do a more detailed description of any KPU agent using the agent as the focus of the display.

We assumed that we would spend the duration of the project elaborating the Figures 3a and b and developing maps like Figure 3c for the relevant regulators chosen as case study topics.

The Taxonomy of Elements and Relations in the KPU Infrastructure

The importance of an adequate taxonomy of elements and relations became clear as soon as the first maps began to take shape. There were hundreds of components to keep track of and thousands of possibly relevant interrelationships. If the collection of influences that have impact on the teacher, for example, are to be easily identified and tracked and the second-order regulators of those influences are to be identified in turn, then one common classificatory structure that could serve as the basis for a data storage and retrieval system had to be designed.

The taxonomy had to meet three criteria. First, it had to provide space for classifying all the different phenomena making up the KPU infrastruction (e.g., each type of agent, policy, resource, and relationship). Second, it had to be useful for coding the connection between each element and the rest of the system. Third, it had to be useful for retrieving all the significant connections and elements that surround a given element (e.g., see Figure 3c).

Our initial research indicated a variety of considerations that must go into the design of a taxonomy to meet these goals. The KPU system is generally considered to consist of a number of agents who control, are controlled by, and process the various flows of influence relevant to KPU in education. Agents regulate KPU activities by making, administrating, and responding to various policies. Policies dictate both structure and process in the system. Formal policies are codified and have some legal basis. Timing considerations are considered important because most policies include requirements for certain things to be done at certain times; therefore, a set of timing factors is included. Table 4 shows a sample of the first taxonomy designed to be responsive to these expectations.

Based on this first section of the taxonomy, we drew up a generic agent list (see Table 5). The list allowed for additions indefinitely as needed and the assignment of a set of location and function identifications to each entry, based on the functional and conceptual subsystem maps.

Our goal was to develop similar generic tables in the other categories of the taxonomy, such as flows, policies, informal regulators, timing, and operating conditions. These tables were not yet developed at the time of the interim report.

After solving the problem of providing room in the taxonomy to expand it as needed and to show how each component fits into the larger picture, we addressed the problem of cross-referencing each component with all the relevant connections that converge on it and which it influences by gathering all the data around each component into its own table. This (input-output) table was constructed to complement a graphic. For example, Table 6 is a compilation of the major components of the KPU system that converge on the classroom teacher. (Table 6 is thus complementary to Figure 3c.)

Table 4

TAXONOMY OF ELEMENTS AND RELATIONS IN THE KPU INFRASTRUCTURE

Class/Subclass Identification	Tentative Code
Agent function (I-A)	AF_{nm}
Knowledge production	AF_{10}
Support	AF_{11}
Research/development	AF_{12}
Review/evaluation	AF_{13}
Regulation	AF_{20}
Initiative	AF_{21}
Policy governance/ guidelines	AF_{22}
Fiscal control	AF_{23}
Technical control	AF_{24}
Litigation	AF_{25}
Professional standards	AF_{26}
Linkage	AF_{30}
KPU information linkers	AF_{31}
Consulting	AF_{32}
Personnel training	AF_{33}
Professional media	AF_{34}
Mass media	AF_{35}
Material marketing	AF_{36}
Informal	AF_{37}
Knowledge Utilization	AF_{40}
Administrative	AF_{41}
Teacher/facilitator	AF_{42}
Student/learner	AF_{43}
Political influence	AF_{50}
Agent location (I-B)	AL_{nm}
Federal	AL_{10}
State	AL_{20}
Regional/county	AL_{30}
District	AL_{40}
School	AL_{50}
Learning setting	AL_{60}
Voluntary and miscellaneous groups	AL_{70}
Philanthropic foundations	AL_{71}
College/university	AL_{72}
Nonprofit corporations	AL_{73}
Profit corporations	AL_{74}
Associations (including consortia)	AL_{75}
Ad hoc groups	AL_{76}

Note: Within a major class, agents are described by a two-dimensional matrix, with I-A and I-B providing the respective axes. This project team, insofar as it is a component of SRI, would be located in cell AF_{11}:AL_{73}.

Table 5

GENERIC AGENT LIST

Numeric Code*	Agent Name	Location (AL)†	Function (AF)
1	Federal Educational Agency (includes No. 2-10 below)	10	20, also those below
2	U.S. Executive (President, Executive Office)	10	22
3	U.S. Congress	10	21
4	Office of Management and Budget (OMB)	10	23
5	Department of Health, Education, and Welfare (DHEW)	10	20
6	Assistant Secretary for Education (ASE of DHEW)	10	20
7	National Center for Education Statistics (NCES)	10	11, 12
8	U.S. Office of Education (USOE or OE)	10	20
9	National Institute of Education (NIE)	10	20
10	Formally Established EKPU Advisory Groups (Federal)	10	32
11	Federal courts	10	25
12	Other Federal agencies having EKPU-related functions	10	20
13	Advocacy groups (Federal level)	70	50
14	State Education Agency (SEA)	20	20
15	State Executive Officer (Governor)	20	22
16	State Legislature	20	21
17	State Board of Education (SBE)	20	22
18	Chief State School Officer (CSSO)	20	21, 22
19	State Department of Education (USOE or DOE)	20	20

Table 5 (Continued)

Numeric Code*	Agent Name	Location (AL)†	Function (AF)
20	Formally established EKPU advisory groups (state)	20	32
21	Other state agencies having EKPU-related functions	20	20
22	Advocacy groups (state level)	70	50
23	Research and testing institutions (including R&D)	70	10
24	State courts	20	25
25	Material producing institutions (includes publishers)	70	36, 50
26	Personnel training institutions (Teachers Colleges)	70	33
27	Professional associations and consortia	75	26, 31, 50, others
28	Professional media	70	35
29	Academic sector (colleges and universities)	72	10, 30
30	Regional Education Agency	30	30
31	Local Education Agency (LEA)	40	20, 30, 41
32	County Department of Education	30	20, 30
33	Local Board of Education (LBE)	40	21, 22, 23
34	School District Administration	40	22, 23, 24, 31, 41
35	School Administration	50	22, 23 24, 31, 41
36	Department Administration	50	26, 31

Table 5 (Concluded)

Numeric Code*	Agent Name	Location (AL)†	Function (AF)
37	Teachers (learning setting, classroom environment, and so on)	60	31, 42
38	Students	60	43
39	Formally established EKPU advisory groups (local)	30, 40, 50	24, 32 50
40	Advocacy groups (local level)	70, 76	50
41	Local courts	30	25
42	Teacher centers	30, 40, 71, 72, 73, 74	31, 33
43	Extra classroom learning environment	60	37
44	Electorate	70	50
45	Attorneys	70	25

Note: Additional agents, a lower level of aggregation, can be identified according to the same protocol; for example, a school district curriculum specialist would be AL(40), AF(31) and a member of Agent No. 34.

*A code for purposes of abbreviation on the maps and charts.

†Partial listings only.

No.	Agent/Agency
37	Teacher

Table 6

SIGNIFICANT FLOWS THROUGH THE CLASSROOM TEACHER

Line No.	Entry Frequency	INPUT FROM	INPUT Flow Type	INPUT Code	INPUT Formal Regulators	PROCESS Process Information	PROCESS Evaluation?	PROCESS Significant Process Regulators	OUTPUT Flow Type	OUTPUT Code	OUTPUT Formal Regulators	OUTPUT Next Agent Evaluation?	OUTPUT TO	Output Frequency	Line No.
1	Con/Int	25	Textbook (FM10)		PP50				Assigned Use (FM10)		Time Spent		38	Contin	1
2											per subject				2
3											AL20/PS30/PP30				3
4	Con/Int	25	Teacher's Ed (FM10/FI22)		PP50	Use of Text			Teaching Methods (FI22)				38		4
5	Past	26	Prepractice Training		PP90	How to Teach			Teaching Methods (IT20)				38		5
6	Yearly	26	Continuing Education		PP90								38		6
7	Yearly		Salary Increment		PP80			"Hurdle Credit"	Teaching Methods/		Mostly		38		7
8								(PP80)	Upgraded Job		Informal				8
9	Con/Int	28	Prof. Journals (FI22)		None	New Ideas,		(RA10, RA20)	Teaching Methods/		Mostly		38		9
10						Practices			Materials		Informal				10
11	Int	29	Inservice, Workshops		AL40, PP30,	New Ideas,			Teaching Methods (FI22)		Mostly		38		11
12			(FI22,23)		PP80	Practices					Informal				12
13	Int	29	Consultant (FM20,FP30)		AL40, PP30,	New Ideas,			Teaching Methods (FI22)		Mostly		38		13
14					PP80	Practices					Informal				14
15	Int	30	Information Linker		AL30, PP80	New Ideas,		(RA10, RA20, RA30)	Teaching Methods		Mostly		38		15
16			(FI22,23)			Practices			(FI22,23)		Informal				16
17	Int	31	Release Time		AL40, PP40			Non EKPU Roles of	Teaching Methods		Mostly		38		17
18								Actors (IT40,RA20)	(FI22,23)		Informal				18
19	Contin	34	Curriculum Specialist		AL40, PS20,	Specific Help			Teaching Methods		Mostly		38		19
20			(FP40)		PP70				(FI22,23)		Informal				20
21	Contin	37	Other Teachers (FI22,		None	Idea Transfer		"Shop Talk Taboo"	Teaching Methods		Mostly		38		21
22			FI23)					(OF50)	(FI22,23)		Informal				22
23	Int	42	Teacher Centers (Ideas)		AL75, AL40,			(RA10, 20)	Teaching Methods		Mostly		38		23
24			(FI21,22,23)		PP80						Informal				24
25	Int	42	Teacher Centers		AL75, AL40			(RA10, 20, 30)	New Materials (FM20)		Mostly		38		25
26			(Materials) (FM20, FI23)		PP80						Informal				26
27	2 Years	34	District Level Evaluation		AL20, PS20,	Behavior to	✓	RA40, OP40	Modified Performance			✓	38		27
28			School Level Evaluation		PP60, AL40	be Improved,		OF10							28
29			Parents Evaluation		AL50, PP60	Student Per-									29
30			Students Performance			formance,	✓	RA40, IT40	Student Grades and			✓			30
31						"Grading			Comments						31
32						Papers"									32
33															33

Note: This table displays the influence on and by the teacher as a member of the KPU system.

Entry Frequency pertains to when the influence occurs.

Input lists influences flowing into the setting to the teacher.

Process lists the activities conducted by the teacher herself.

Output lists the influences flowing from the teacher.

The code numbers under the three columns labeled "Regulators" pertain to the taxonomic classification of the influence identified in the column to the left.

Finally, by taking the information thus gathered, we planned to create a series of overlays for the basic maps to show how influences converged on specific agents through "process loops." Figure 4 shows the basic template of LEA agents and the six overlays applied to that template.

The Image of KPU

At this stage in our project the field investigations, aimed at providing empirical support for our image of KPU, proceeded fairly straightforwardly. They seemed to be providing the incremental refinements for the analytic framework we expected they would.

We began to realize that KPU has more governance levels than our first functional subsystem map portrays. At the minimum, most states have regional or countywide educational service agencies which hold a formal governance position in KPU halfway between the LEA and the state. This would necessitate adding more hierarchic levels to the functional subsystem map and expanding the sophistication of the linkage categories in the taxonomy. We still saw KPU as having a regulatory structure marked by formal policies, but we were surprised to find both the sheer volume of policies and yet the amount of discretion many KPU agents have especially at the LEA level. Having expected to find real conflict among regulators and instances of policy overload, we interpreted the myriad stories we heard of thwarted effort as evidence that this search would be fruitful. While we still expected to find that KPU is a system, we found evidence of the suggestions we had read about in the literature, namely, that KPU's formal sectors seem to be clustered into two almost distinct subsystems, a KP subsystem and a KU subsystem.

Several important but small clarifications of basic concepts began to take place. We found that PPR is an ambiguous term that refers to some sort of disembodied dynamism. Formal policies made and used by

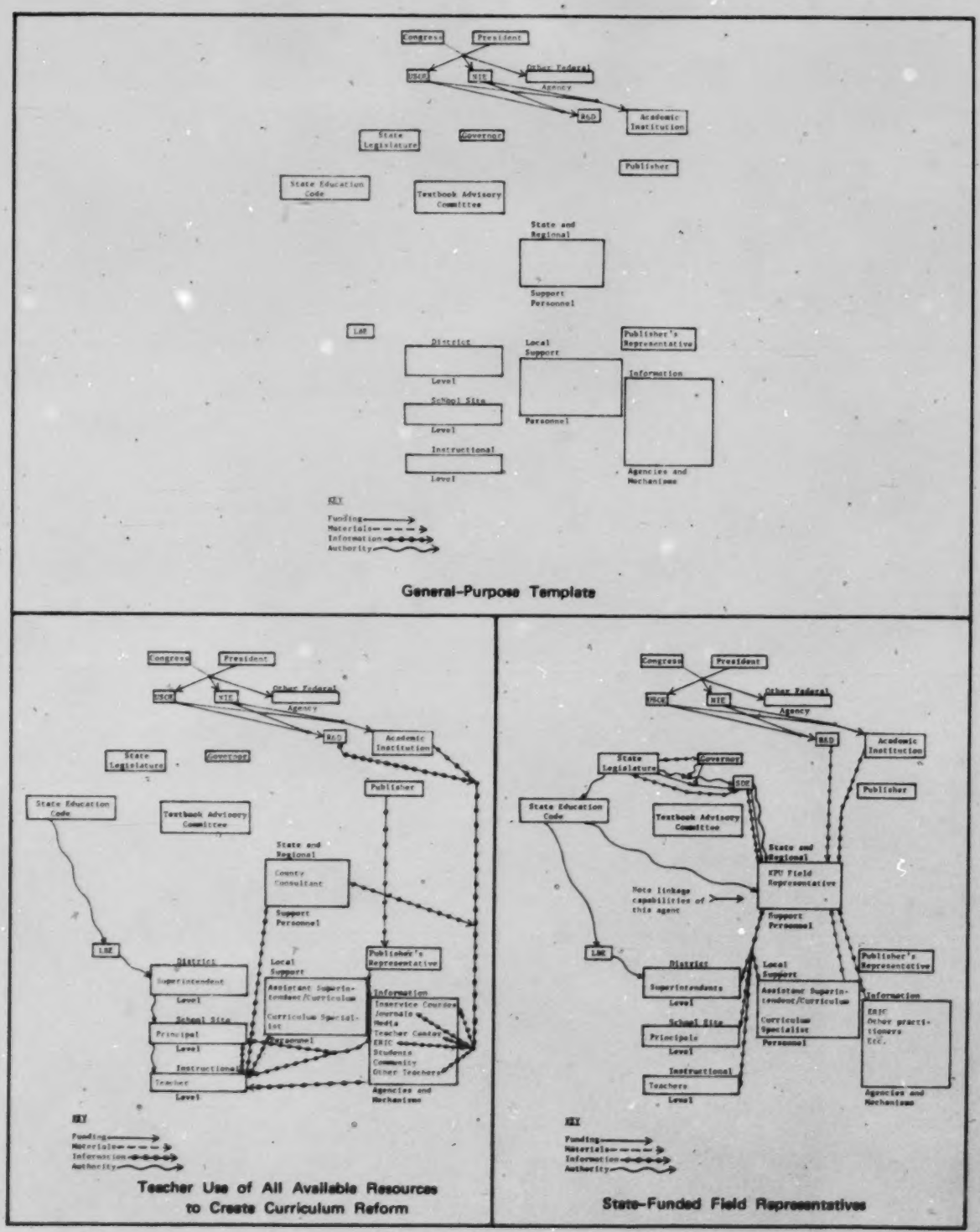
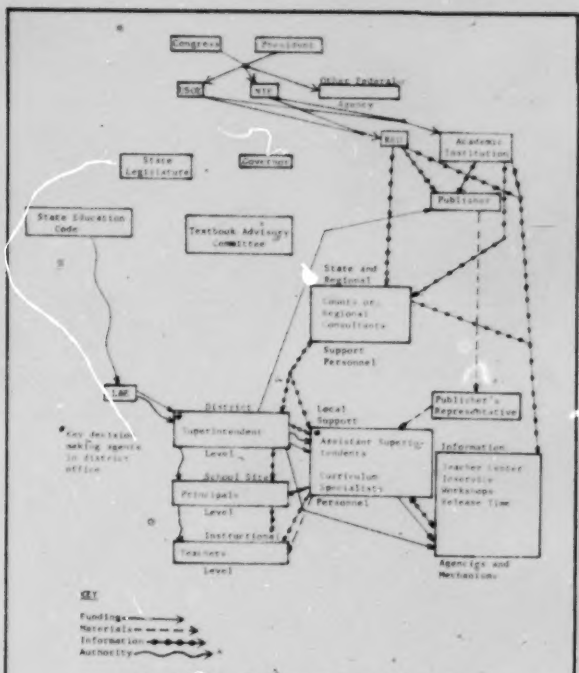
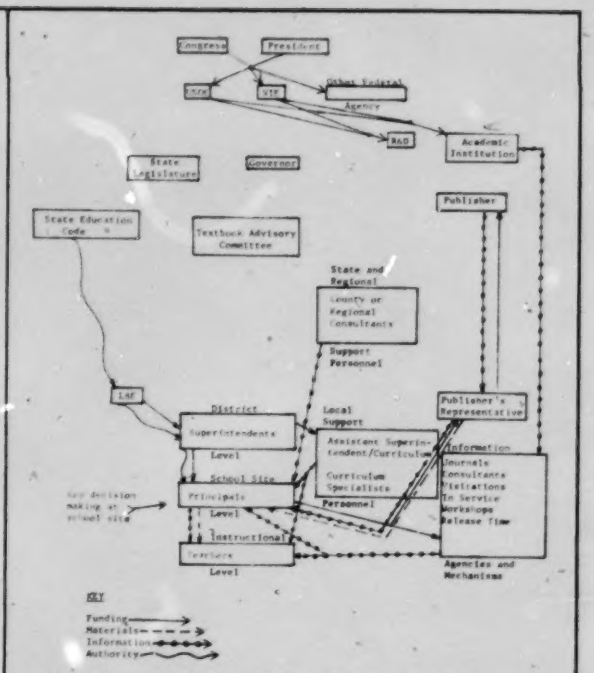


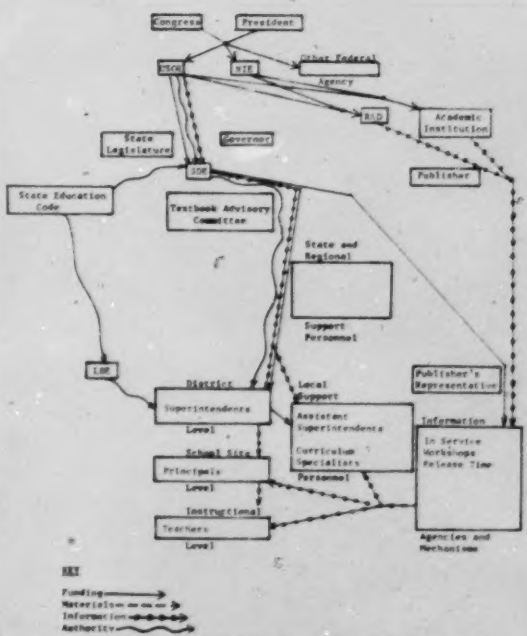
FIGURE 4 THE PHASE 1 GENERAL PURPOSE TEMPLATE



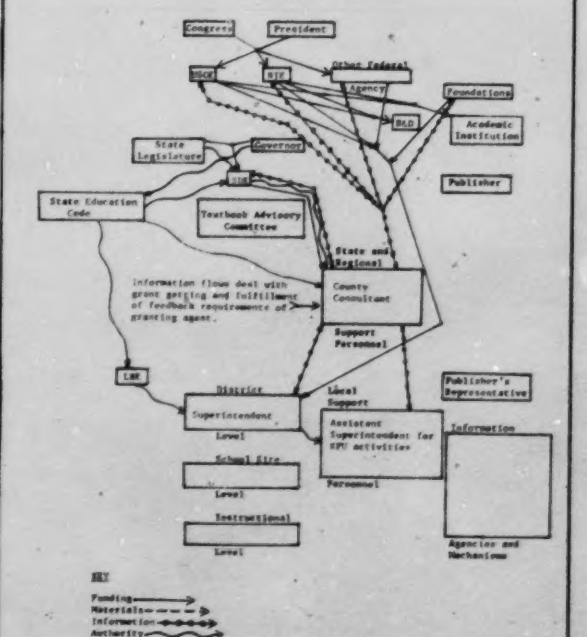
Curriculum Reform Generated at the School District Level



Curriculum Reform Generated at the School Site Level



Federally Funded Curriculum Reform at the School District Level



County Department of Education Consultant For KPU Funding and Paperwork Requirements: California

FIGURE 4 (Continued)

agents to guide activities are what mark this dynamism and make it monitorable. Similarly, flows are monitorable only in terms of the resources and information that are exchanged between agents.

The most serious difficulty seemed to be in the area of determining the significance of KPU system components. Except in terms of the gestalt of the case topic writers, there seemed to be no way to get a frame of reference and a standard to determine significance. Even the master systems maps were little help without a preconceived notion of what was valuable and what were the cause and effect links. However, we assumed that this problem would gradually be resolved with the elaboration and refinement of the analytic framework. As the general maps became more detailed and the context more clear, it would be possible to recognize "significance" with greater ease. (We did not consider the possibility that it might get more difficult as the conflicting values of more constituencies were considered.)

Project Status at the Interim Report

At the end of the first six months of the project as we prepared the interim report, we had a basic image of the analytic framework. It is a loosely structured set of mapping and taxonomic tools that enable better understanding of how the KPU system operates and is governed. A necessary first task in the development of the framework entails a preliminary mapping of significant portions of the KPU system because as a methodology the framework is holistically oriented. These maps would be the principal guides to what data to monitor. With the understandings thus obtained, inferences for both the final formulation of the analytical framework and the design of the monitoring system would be made.

II THE EFFORT TO DESCRIBE THE KPU INFRASTRUCTURE

Overview of Section II

In this section we describe how the basic assumptions and study methodology were revised. Rather than attempting to map KPU into some classification scheme, we had to alter the whole study strategy. We decided that the development of the analytic framework must be empirically designed from the bottom up--that is, the description technique must be suited to the specific realities of the subject matter on which it is to be used. Thus we developed a methodology for describing units of KPU without first requiring agreement on an overall picture of KPU. This methodology has as its objective the development of alternative descriptions of the KPU infrastructure as seen from various perspectives and for various purposes. The methodology itself is systematic and rational, like the scientific method, but it does not presume that KPU is a system or that it is complete, consistent, and follows immutable laws. (In fact KPU is none of these.) Like the scientific method, the analytic framework is designed not only to survive but to support radical revisions in our theories of KPU.

By drawing on a series of empirical case studies, we generated a preliminary image of KPU. From it we derived specific expectations for an analytic framework to guide description of the KPU infrastructure.

Review of the Progress of the Project: Problems with the Analytic Framework and Taxonomy

Soon after the interim report we gathered together the staff and advisors to try to identify, organize, and interpret the problems turned

up by the writing of the report. This would allow us to make necessary modifications in our concept of the project goal (e.g., what describing the KPU infrastructure should mean) and in the methodology of our study plan.

Because the expectation had been that there would be a reasonably complete analytic framework and taxonomy at the time of the interim report, the fact that there were still distinct problems with each stood out as our foremost concern. While the expectation for the analytic framework master maps had crystallized, we did not seem to be able to find the formula to fill that expectation. The question therefore was, Why? Likewise the taxonomy seemed to call for straightforward elaboration of categories and generic tables but ambiguity increased as we became more concrete, specific, and detailed. What were the sources of the difficulties and how could they be overcome?

Problems with the Analytic Framework

Two components were central to the framework:

1. A complete and coherent image of KPU on which to base a master map (template) of the whole KPU system.
2. A set of classificatory and graphics tools to describe the elements and dynamics of that system particularly in terms of basic functional and conceptual subsystem categories.

The central problem was that we had not satisfactorily clarified the first component. Specifically we had not been able either to clarify or integrate the basic image of KPU. When we went to the field to elaborate the functional master map (Figure 3a) with empirical findings we discovered that the more specific the setting the more unique was the way in which functional tasks were divided and assigned. Generalizations rapidly faded. Thus we were forced either to make the number of categories

explode or to assign arbitrarily agents to categories which were not really appropriate. Moreover there was a second dimension to the problem. When we attempted to pull together the picture of the dynamics of any given KPU situation the maps mixed multiple perspectives like cubist paintings. As the interim report shows, we resorted to overlays to sort out some of the complexity and make reasonably intelligible maps (see Figure 6). However, this disguises the problem of picturing the same situation from the multiple, contrasting perspectives which ought to be brought to it.

The search to explain why these problems arose and what to do about them at first led us to propose that it was simply the complexity of the KPU field. Even with the limits of scope which we had established, the proliferation of agents, policies, and activities was enormous. Could it be that the descriptive task was simply too large to be manageable with our limited resources? Perhaps to describe KPU adequately would take an effort similar to that necessary to produce the descriptive analytic framework in zoology.

We reasoned that it ought to be possible to complete a sample description by limiting the universe to one small school site, for example, and by simply describing that. However, the "cubist" maps problem precluded even this. There was something more fundamentallly wrong with the approach. Somehow, through the assumptions and limitations we had placed on ourselves, we had boxed ourselves into a corner.

Our experience in conducting the field interviews prevailed at this point. We realized that there isn't one way to conceptualize KPU but many, depending on one's perspectives, values, and reasons for creating an image of KPU. The basic approach that we had been taking was a social indicators approach. Our hypothesis had been that if we developed one general and adequate model of the KPU system we could locate not more than several dozen key variables or indicators that could be monitored to track the

health and progress of American KPU. But people with different roles, values, and political goals will see different aspects of KPU as significant, different relations as binding regulators, and different outcomes as valuable.

Moreover we began to realize that there were several dangers in trying to create one image of KPU. The approach we were taking at best would produce a relatively simple abstract analog model of KPU and not actually describe the way KPU itself works. This would leave us with very few clues about how to change or mold the actual KPU infrastructure that exists in the world. Second, the approach tended to encourage reification of one's conceptual categories. We began to try to fit KPU events to our classification system rather than recalling that these were merely concepts to be used whenever they proved effective.

Simultaneously, as we delved deeper into the systems literature we were struck by the fact that living systems survive because they possess sufficient complexity to perceive and respond to the variety in their environment, not because they impose highly simplified images on reality or (worse yet) try to keep the whole of their environment from changing.

Put simply, we had been trying to get the KPU environment to behave as if the conceptual subsystems of knowledge production, knowledge utilization, knowledge production support, knowledge utilization support and linkage, or some permutation thereof were the one whole coherent picture of KPU rather than designing a way to produce pictures to fit what was really happening in KPU.

Problems with the Taxonomy

The same explanation also accounted for the difficulty we were having with the taxonomy.

Our initial effort toward building a taxonomy of policies centered on developing a strategy by which the research team could input to a central record (for future cross-referenced retrieval) policies which either directly govern or impact KPU that they found through work on the case studies. While we had tried to provide flexibility by leaving room to expand major categories and generic lists we were turning up items that belonged either simultaneously to all of the major categories or ambiguously to one or more. Categories often contained most of their items at intersections with other categories. Worst of all, we had not successfully developed a defensible boundary rule to distinguish what is and is not KPU.

The difficulty seemed to lie in trying to create one universal taxonomy for a subject matter more properly treated from multiple perspectives. Individual writers reported they could recognize and assign significance to agents and policies relative to the theme they were exploring but not relative to some set of arbitrary universal categories.

These findings pointed out fundamental considerations that must be taken into account in research effort; namely, that it is the particular situation in which a policy is applied and the combination of various agents, activities, resources, and other policies that determine the significant features of a policy. Hence there is not one set of policy categories that will portray the governance of a particular subsystem from all the relevant perspectives. The significance of the policy to the study being conducted is not always isomorphic with the overall thrust and interpretation of the policy or its significance to other areas of KPU. Consider, for example, the study of instructional materials adoption process (Case Study X). The researcher is quite justified in finding the Ninth and Tenth Amendments to the U.S. Constitution as significant to the instructional materials adoption process because they have been interpreted to preclude the federal government from making direct policy mandates concerning curricula in the public schools. However, to use this property

of significance to build toward a general policy file would be misleading because these amendments are much broader in scope. Yet to taxonomize them in their broader sense would both overburden the researcher and obfuscate the significance of the policy's relationship to KPU.

As a result, while attempting to reformulate our basic concept of the analytic framework and the structure of our study plan, we shifted the focus of the taxonomy away from categorization toward description. That is, instead of assigning policies to preset categories, we assigned descriptors to policies. Taking our lead from the ERIC filing system, we began to experiment with using the taxonomy purely as an indexing system. This would allow us to add flexibility to the classification system as needed even if it cut across previous categories. Writers could classify elements based on their significance in the context in which they found it and this classification could be expanded as more connections were uncovered.

While we still retained such major categories of descriptors as source, type, and content or target, this shift marked the first major change in the direction of our thinking to relative rather than absolute descriptions.

Basic Assumptions Challenged

Through this examination of the analytic framework and taxonomy, we came to the conclusion that we had become caught up in our own myth and rhetoric about KPU and that what we had most to do was reexamine and reformulate our assumptions based on observed empirical features of KPU.

We decided that our basic problem lay in the assumptions we were using in an analytic framework. These assumptions in condensed form were: as follows:

1. We had been looking for a universal perspective on KPU when education is a complex, value-laden matter that is viewed from many contradictory perspectives by different policy-setting constituencies. The framework has to be useful to enlighten each of these.

2. KPU, if it is a system at all, is a social system (i.e., artificial, man-made). Hence it can be expected to have gaps, inconsistencies, and sources of indeterminacy not found in natural systems. Unlike the chemist or astronomer we cannot assume that what we are studying is a coherent system that will admit of "discipline" study. At best, KPU should be regarded as an eclectic field of activity until demonstrated otherwise.

3. The expectations of finding specific indicators of KPU performance, and, moreover, that they should be marked by formal policy are probably quite naive. In the first place, control or regulation in complex systems is relatively well dispersed. Management cannot assume direct autocratic control of everything that happens. The systems concerned are just too big. KPU is a self-organizing system which metabolizes the inputs from all its components at its many levels and entry points. It may be that there simply is no set of specifically identifiable managers of KPU, yet it works and progresses.

We had been led astray in studying the nature of the extant and accepted managerial process itself. To make studies of the regulators was the obvious thing to do; and yet "the regulator" turns out to be the embodiment of something we might call "regulating principle"--that set of characteristics discovered in any viable system through which the system maintains its organization.

The regulatory infrastructure is not so much a part of the system managed as it is the system's own designer. Because KPU is not a tight-knit, well-defined, single-purposed system, decisionmaking is pervasive throughout the infrastructure; it takes place at most locations of activities and at many different times. Furthermore, when some regulator can be identified, it is likely that either the agent or the formal policy is not so much the regulator as the pattern of the situation is.

Several reorienting questions thus emerged. What would happen if we shifted the search from identifying the significance of the role of specific actors and policies to the regulatory impact of the patterns of KPU?

Instead of testing different versions of a conceptual image of KPU to underpin the analytic framework, could we profitably shift the effort to develop a strategy that would expose the structure and role of both individual KPU components (policies and agents) and the pattern of components regulating KPU? We began to investigate whether we could move back our effort to develop a methodology one conceptual level and design a systematic method of inquiry into what the structure of KPU is rather than how it can be pictured with one particular image.

We began to take stock of what we thought were the characteristics of KPU, the KPU management system, and what characteristics an analytic framework ought therefore to have. We decided that first and foremost a paradigm for inquiry into the KPU infrastructure--if it is to be valid--would have to provide a realistic description of the KPU infrastructure. This led us to reflect on what our case studies were telling us were the important "real" features of KPU infrastrucure.*

In other words, we were taking a reversed approach from phase one (a redefinition of "bottom up"). Could we develop a systemic strategy to view KPU (like a scientific method) such that the method itself was complete and consistent but did not presume a holistic concept of KPU as its first principle?

Such a strategy would be a distinct contribution in that it would permit development of whole new paradigms of KPU without requiring radical revision itself much as the scientific method is only incrementally revised when major theories in different fields and disciplines are overthrown.

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* By this time we had abandoned our original goal of simply developing an analytic framework and then testing it with case studies. We now were increasingly relying on the case studies to provide information with which to form and refine the framework.

An analytic framework for a monitoring program ought to survive revisions of KPU theory (such as R&D becoming RDDA, becoming KPU) without necessitating radical revision of the methodology itself. Thus the problems with the analytic framework led us to consider developing it as a strategy for forming "empirical generalizations" about KPU rather than theories of KPU (Kaplan 1964).

Expectations for the Analytic Framework: The New Bottom-Up Approach

Having reached this point of examining the preliminary case studies for analytic purposes the framework should meet, we found ourselves assembling a list of how the framework could meet these expectations as the natural next step of our efforts. Moreover we found we were no longer assuming de facto that KPU was a system. The time had come to reconsider our study plan directly and reorganize the logic of the remainder of the project.

The list of expectations for the framework we now found reasonable follows:

- The framework must highlight only information that is important to a given application.
- It must cover and reveal the possible impacts of a given policy, by identifying all agents, activities, and resources governed or influenced by a given policy.
- It must provide a mechanism to identify all policies that govern or influence a given agent, activity, and/or resource.
- It should assist in the identification of stages that are required by a policy, indicating the specific agents and resources involved.
- It should incorporate ordering into time of activity components.

- It should display the qualitative difference between configurations, for example, those that are ongoing (An SEA, a bureau within NIE) and those that are episodic (an ad hoc group, such as a certification committee).
- It should provide a means to link a particular policy (or policies) with a particular behavior set, for example, asking, For goal-oriented activity A, what policies (x, y, z) are relevant?
- It should provide a means to indicate the evolution or causal linkage between various policies.

An analytic framework should be a set of tools to construct a view of the functioning KPU system rather than, as the term implies, that view itself. This approach is more reasonable since it allows the researcher to take the approach we are developing and tailor it to his own needs. Because this approach must be purpose-specific, the following purposes can be used to exemplify typical applications:

1. Identify how a particular policy contributes to the completion of some higher level goal through investigations of:
   (a) Activity coordination: identify the policies and activities that serve to coordinate the target activity with other activities in service of larger KPU goals.
   (b) Resource accessibility: identify the adequacy of resources to carry out a particular policy.
   (c) Policy coordination: identify how a specific policy coordinates a set of policies to specify a given activity or to regulate some agent or resource.
   (d) Agent/activity impact assessment: list responsibilities and concerns carried by a set of agents or activities and estimate the impact of the target policy on the life of one or more of these agents or activities.
2. Identify the elements of the policy through the investigation of:
   (a) Agent/activity identification: list all agents or activities having enforcement or compliance responsibility under a given policy.

(b) Activity analysis: break the activity specified by the policy into its constituent stages and elements (policies, agents, and resources), and show how the elements interact as the activity is performed.

(c) Policy/activity design: on the basis of existing knowledge, assess each stage of a proposed policy or activity in terms of requirements for proper functioning.

(d) Policy identification: list all significant policies

(1) a given agent or activity is responsible to enforce.

(2) a given agent or activity is responsible to comply with.

3. Identify the impacts of policy through

(a) Impact identification: map all the activities, agents, resources or policies that are (or might be) significantly impacted by a given policy.

(b) Agent/activity impact assessment: analyze the effects on a given agent or activity of the entire spectrum of policies acting on it.

(c) Policy dynamics: identify other policies that aided or impinged on the developmental process.

4. Describe policy simply and clearly through

(a) Identification of the policy(s), generated at the level of the aggregate agent, and specification of the stages of the activity.

(b) Identification of the various stages of the activity in order or occurrence, the particular agent responsible, and the requisite resources.

(c) Identification of other policies that affect these in their operation. If indicated, describe conflicting policy(s).

Project Methodology: Phase 2

While the tasks to be performed in Phase 2 were no easier than those in Phase 1, there are fewer steps to be shown graphically. (Compare the new plan shown in Figure 5 with that shown earlier in Figure 2.)

The goal of our new study plan is to develop an analytic framework specifically tailored to describe the role of formal policy as an influence on KPU and to draw from it and from the case studies specific recommendations to present to NIE. To reach this goal, we will use the case studies to develop empirical generalizations that will clarify our image of KPU. Conversely our image of KPU at the interim report will provide the basis for selecting case topics for further pursuit and assigning specific analytic purposes to be tested in each topic.

Both the case studies and the image of KPU will be used to derive the specific expectations to be used in forming the final version of the analytic framework.

Therefore a new system of emphases and organization of tasks emerged. We placed more emphasis on the case studies. Because we were now searching through the case studies to identify what it was important to say rather than selecting what to say using an a priori analytic framework, much more effort and "mucking about" had to go into them. Conversely since most of the case study work was preceding the framework, and being used to develop (rather than to test) the framework, the cases would not generally demonstrate how the framework was applied (except in a post hoc fashion).

This plan is based on the assumption that the nature of KPU components should be taken into account in forming the framework. Specifically some of the features of these components are that they have parts and relations that must be described. They have wholes which have properties that emerge because they are wholes. And they exist in a larger education social and physical environment which impinges on them. Moreover different audiences

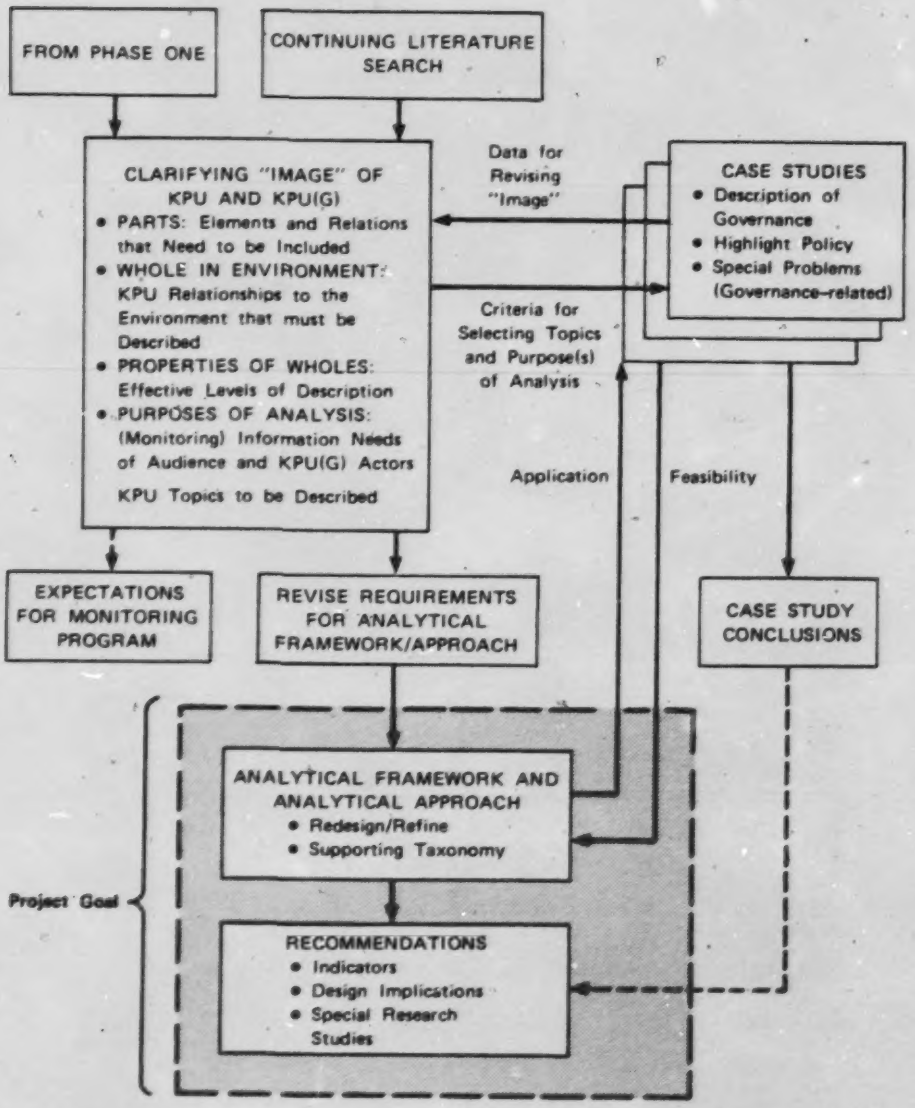
FROM PHASE ONE
CONTINUING LITERATURE SEARCH
CLARIFYING "IMAGE" OF KPU AND KPU(G)
• PARTS: Elements and Relations that Need to be Included
• WHOLE IN ENVIRONMENT: KPU Relationships to the Environment that must be Described
• PROPERTIES OF WHOLES: Effective Levels of Description
• PURPOSES OF ANALYSIS: (Monitoring) Information Needs of Audience and KPU(G) Actors
KPU Topics to be Described
Data for Revising "Image"
CASE STUDIES
• Description of Governance
• Highlight Policy
• Special Problems (Governance-related)
Criteria for Selecting Topics and Purpose(s) of Analysis
Application
Feasibility
EXPECTATIONS FOR MONITORING PROGRAM
REVISE REQUIREMENTS FOR ANALYTICAL FRAMEWORK/APPROACH
CASE STUDY CONCLUSIONS
ANALYTICAL FRAMEWORK AND ANALYTICAL APPROACH
• Redesign/Refine
• Supporting Taxonomy
RECOMMENDATIONS
• Indicators
• Design Implications
• Special Research Studies
Project Goal

FIGURE 5 STUDY METHOD IN SECOND PHASE

will see different components in the KPU field and will use different perspectives to describe the same component.

The analytical framework must be tailored to be useful in face of all of these observations. Moreover these expectations would contain specific implications for the monitoring program into which the framework should fit.

We stopped searching for "the correct paradigm" of KPU and began developing a general method of inquiry into KPU governance flexible enough to serve even antithetical perspectives and value systems. The analytic framework was now expected to be a tool for guiding concept formation rather than for systems mapping of KPU sectors.

This strategy should permit the incremental development in an NIE monitoring program of an ecology and anatomy of KPU so that gradually social indicators can be selected and their significance understood. A major advantage in using this new strategy was that it was not necessary to agree on the basic conception of KPU or how KPU is best portrayed in order to proceed. Like the scientific method, it would allow each analyst to pursue his own hunches and line of investigation and yet contribute overall to an evolving description of the real world.

The Focus on Formal Policy, a Regulator of KPU

The shift in the methodology of the study was accompanied by a shift in our presumption about the role of policy and formal regulators of KPU. Rather than presume that there are distinct regulators of the system we asked whether there are distinct regulators of the system. Because our formal charge was to describe the role of formal policy in KPU governance, we centered our data gathering around policy and used policy archives and related records as our basic data source.

Our major question shifted from, How does policy regulate the system? to, How well do the data in policies and policy archives serve as the basis for describing the governance of configurations and their infrastructures?

The first cycle through this new plan was conducted to produce three outputs: an initial list of the types of specific expectations we had for the analytic framework, a clarification of our expectations for the taxonomy, and a selection of the case topics to be pursued in the remainder of the project.

Expectations for the Analytic Framework

Three basic expectations for the framework were immediately identified. Because we now saw our goal as simply describing KPU, the first expectation for the framework was "realism." As far as possible the reconstructed logic produced by the framework as descriptions of the KPU infrastructure had to correspond to the actual logic in use of that infrastructure. Second, the descriptions produced by the framework had to have pragmatic value or usefulness. It is not enough that the descriptions be valid; they must have a favorable cost-benefit trade-off and make a positive contribution to KPU policy planning. Third, the framework must have communicability, by which we mean that the models and policy implications that are produced by using the framework are communicable.* Furthermore, the framework itself must be communicable. How easily can the paradigm be taught to other individuals? How can it be incorporated into the policy planning procedures of NIE or any other agency?

We hoped to fill in and expand on these three expectations based on the feedback from the case studies and the continuing literature search.

*It is not enough for policy-related results of an analysis to follow validly from it. It is important to be able to show that they follow validly.

The Role of the Taxonomy: Making the Analytic Framework Teachable

The new study plan suggested a rather radical shift in our concept of the role of the taxonomy. Since we were using the cases formatively in the development of the framework we needed a strategy to keep track of where relevant policy data were to be found and to help generate appropriate questions to ask of data sources. Conversely, as the framework developed we needed a way to record and communicate among ourselves the principles that made up the framework.

The concept of a taxonomy to serve these goals was put forward. This taxonomy, organized around policy, would be a heuristic guide to relevant policy types and an aid to developing a checklist of information suitable to complete an analysis aimed at serving a specific purpose.

As a heuristic guide to inquiry this taxonomy would contain and be organized by the principles of the framework and would thus constitute a major tool useful to communicate the framework as a methodology to other investigators.*

Selection and Orientation of the Case Study Topics

The final selection of case study topics was conducted with the following limitations in mind:

- Show first and foremost what must be in the framework to deal adequately with formal policy influences in the KPU infrastructure.
- Determine how well policies will serve as the principal source of information describing the KPU infrastructure.

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*In fact, what we finally concluded was that a heuristic taxonomy and a method for communicating the analytic framework should be developed separately.

- Because of limits of resources, provide insights into developing a strategy for but not actually trying to work out the complex detail of the interaction of policy networks.
- Span the domain of KPU to expose the range of inferences for a monitor program.

Hence we chose the ten case study topics listed below.

I. National Institute of Education (NIE) Allocation Policy.

II. Federal Procurement Policy and Knowledge Production and Utilization in Education.

III. Assessing the Impact of Policies that Control the Availability of Information.

IV. The Far West Laboratory as a Research and Development Performer.

V. Minicourses as an Example of Policies Affecting the Dissemination/Utilization of a Successful R&D Product.

VI. The School Mathematics Study Group (SMSG) Project as an Example of Policies Affecting the Dissemination/Utilization of an R&D Product.

VII. ESEA Title III Teacher Initiated Innovation Program: An Example of Policies Interfacing Levels of Government.

VIII. The Governance of Knowledge Production and Utilization in Intermediate Service Agencies: Boards of Cooperative Educational Services in Colorado and New York.

IX. Policies Affecting the Results of the Federally Sponsored Pilot State Dissemination Program in South Carolina: 1970-73.

X. An Approach to Monitoring the Role of Government Policies in the Process for Selection and Evaluation of New Instructional Materials.

These topics were chosen specifically to cover the range of governance agencies from the school site to the state and the federal levels and the types of KPU activity from basic research to linkage and utilization (see Table 7, third column). Because we were focusing on the formal control messages in the system we also investigated the spectrum of policy types running from constitutional law to research facility contracts and school site memos (see Table 7, fourth column).

Table 7

SPECTRUM OF CASE STUDY COVERAGE

	Governance Levels*	KPU Activity†	Important Policy‡
I National Institute of Education (NIE) Allocation Policy	Federal (Legislative, Administrative)	(1) Setting NIE Budget Priorities. (2) We focused on the structure and operation of the NIE-Congress interaction of determining priorities.	Statutory (Federal) Regulation (Federal)
II Federal Procurement Policy and Knowledge Production and Utilization in Education	Federal (Executive, Administrative)	(1) Distribution of NIE Funds. (2) We focused on the allocation decision system and identifying preferred strategies of funding.	Statutory (Federal) Regulation (Federal) Guidelines (Federal)
III Assessing the Impact of Policies that Control the Availability of Information	Federal (Legislative, Administrative)	(1) Protection of and access to education records and information. (2) We focused on the impact on research and dissemination caused by limiting access to student records.	Statutory (Federal) Regulation (Federal)
IV The Far West Laboratory as a Research and Development Performer	Federal (Legislative, Administrative) Interstate Regional (New Agency) Private Sector	(1) Development of new KPU agency. (2) We focused on the relation of labs to Federal effort and on identifying the discretion left to the labs.	Statutory (Federal) Constitution (By-Laws of Laboratories) Contracts (Federal-Laboratories, Laboratories-Private Sector) Discretionary Acts (Federal)
V Minicourses as an Example of Policies Affecting the Dissemination/Utilization of a Successful R&D Product	Federal (Administrative) Interstate Regional (New Agency) Private Sector	(1) Classic RDDA. (2) We focused on describing classic RDDA.	Statutes (Federal) Regulations (Federal) Contracts (Federal-Laboratories, Laboratories-Private Sector)

Table 7 (Continued)

		Governance Levels*	KPU Activity†	Important Policy†
VI	The School Mathematics Study Group (SMSG) Project as an Example of Policies Affecting the Dissemination/Utilization of an R&D Product	Federal (Administrative) Special Agency Private Sector	(1) National attempt at curriculum reform. (2) We focused on the topic to provide a contrast to MINI.	Statutes (Federal) Contracts (Federal-Private Sector) (Within Private Sector)
VII	ESEA Title III Teacher Initiated Innovation Program: An Example of Policies Interfacing Levels of Government	Federal (Administrative) State (Administrative) District) (Administrative)	(1) Title III = Integration of RDDA at School Site. (2) We focused on program formation and refinement.	Statutory Law (Federal, State) Regulations (Federal, State) Guidelines (Federal, State) Contracts (Federal, State) Other (State)
VIII	The Governance of Knowledge Production and Utilization in Intermediate Service Agencies: Boards of Cooperative Educational Services in Colorado and New York	State (Administrative) Interstate Regional (Administrative) District (Administrative)	(1) Development and dissemination needs assessment. (2) BOCES organization and governance.	Statutory Law (State) Constitutional Law (Regional) Regulations (State, Local) Contracts (Local, Regional)
IX	Policies Affecting the Results of the Federally Sponsored Pilot State Dissemination Program in South Carolina: 1970-73	Federal (Administrative) State (Administrative) District (Administrative)	(1) Dissemination and utilization. (2) Formative program establishment.	Contract (Federal, State) Guidelines (State) Regulations (Local)
X	An Approach to Monitoring the Role of Government Policies in the Process for Selection and Evaluation of New Instructional Materials	Federal (Legislative, Judicial, Administrative)	(1) Adoption. (2) Material adoption network.	Constitutional (Federal, State) Statutory Law (Federal, State, Local)

Table 7 (Concluded)

	Governance Levels*	KPU Activity†	Important Policy‡
X (Continued)	State (Legislative, Judicial, Administrative) Local Private Sector (Associations, Industry) Classroom (Teacher)		Regulations (State, Local) Guidelines (State, Local) Case Law (Federal, State)

*Governance levels refer only to the principal levels focused on, not all the levels treated in the field.

†Activities include the type of KPU (or RDDA) activity covered in the topic and the aspect of that activity we investigated.

‡Important policies do not include <u>all</u> policies important to the topic area but only all those treated to make the point of the particular topic write-up.

Because of the many facets of the paradigm to be tested within a very limited budget of resources and time, the case studies were each assigned a specific set of four "purposes of analysis," one on each of the four dimensions listed on pages 46-47. Each case was to show interesting substantive insight into an espect of its topic area, pursue a line of investigation that had immediate utility for KPU policy planning, contribute specific insights to formation of the analytic framework; and finally be written up in a way to explicate some aspect of the framework as well as of substance. Three styles of write-up were chosen, one to explicate the findings of an analysis without revealing much about the framework, one to explicate the findings through the framework, and one to show specifically the steps one might follow in using the analytic framework.

The Image of KPU Takes Shape

During the remainder of the project the case topics were gleaned for specifics to flesh out our image of KPU and thereby to contribute specific expectations for the analytic framework. The image that resulted is summarized in the following pages. It is in response to this image that the particular principles that constitute the analytic framework were chosen.

The "KPU" that can be empirically observed is a set of behaviors or activities. They are identifiable as KPU activities by the purposes for which they are conducted. The properties of these activities can be grouped into three classes; some pertain to the parts (the elements and relationships) that come together to accomplish the activity, some pertain to the activity as a whole and are what cause us to see the activity as a whole (e.g., selection of new textbooks), and some pertain to the relationship between that activity and its larger environment. The specific outcome of an activity is affected by formal policy regulators acting on it from any of these three perspectives. Some policies regulate components (e.g., what must be included in the content of textbooks), some

regulate the whole activity (e.g., textbook selection must be conducted periodically), and some regulate the environment of the process thereby affecting textbook selection (e.g., minorities must be treated with proper respect).

This distinction of the three ways of knowing a particular KPU behavior provides a convenient organizer for presenting not only the specific features of our concept of KPU but also our expectations for the analytic framework.

Observable Elements of KPU

What can be directly observed and measured as the building blocks of KPU is not the infrastructure nor the processes as such. It is the people acting as KPU agents, the "policies" they transmit as messages to regulate or coordinate their efforts, the resources they have at hand or declare they need and the specific activities they undertake pursuant to some KPU relevant goal.

Observations About Agents in KPU

1. Most agents who perform KPU tasks are not and do not consider themselves first and foremost KPU agents. KPU is a sideline or small component of their overall role (e.g., all teachers are to some extent KPU agents).
2. On the other hand there are certain classes of agents, particularly at the SEA and federal levels, who depend entirely on federal dollars to continue their KPU tasks.
3. Agents report relatively little dysfunctional constraint by policy overload (except those agents who are trying to make changes from a position outside the formal structure). Some agents, in fact, reported both policy overload and policy conflict to be a useful tool by which they could expand their own domain of discretion without increasing risk.

4. Agents report generally adequate paths to resolve policy conflicts but seek to resolve the conflict only when it works to their advantage. Often policy conflict can be used by agents as a shield.

Observations About Policies in KPU

1. Most of the policies which affect KPU are not first and foremost KPU policies. Usually they were formulated to pertain to either main line educational practice (e.g., the Buckley Amendment) or larger issues (e.g., desegregation).

2. Policy acts in at least five equally as important capacities in the system as that of regulator. Policy

   (a) defines agent roles.

   (b) establishes domains of discretion.

   (c) sets the agenda of concerns.

   (d) serves as a symbol of compromise and as a rallying point for constituencies.

   (e) serves as an archive and historical record of agreements and bargains.

3. Myriad, perhaps most of the policies or norms regulating KPU are informal, cultural, and unwritten. Of those that are formal, only a few percent ever surface as a visible source of constraint. KPU is not mainly regulated by that small visible fraction. (This small percentage is still very numerous in absolute terms.)

4. Real conflicting policies and goals (or at least interpretations thereof) abound, especially in the informal domain.

Observations About KPU Purposive Activities

1. Most of the purposive activities marked with some KPU aspect are not primarily KPU activities (e.g., improve reading performance).

2. KPU and education involve some of the most strongly held values and goals as the basis for activity.

3. There is important and irreconcilable conflict among these goals and values that can be managed in a peaceful way only through political means.

Observations About KPU Resources

1. Most of the KPU resources formally labeled as such flow through NIE and other federal agencies.
2. However the majority of resources used for KPU purposes are not allocated as such.(e.g., local district allocation for implementation of specific new programs).
3. The most easily identified resources are money and personnel.

The Molecules of KPU

One of the major lessons of the case studies is that, since the properties of the components used in KPU make them even more commonly useful for other social purposes, it is virtually impossible to tell a priori what the KPU relevant policies, agents, and the like are. It is only when these components come together in particular ways that they are KPU or KPU relevant. Hence we decided that for purposes of analysis and monitoring there is a smallest intelligible unit of KPU that is recognizable as KPU. This unit is composed of an arrangement of some of each of the four basic components. From the standpoint of analysis these units are recognizable because their manifest behavior pursues some KPU goal. By identifying the unit(s) pursuing specific KPU goals it is possible to identify and interpret the meaning of quantitative descriptions of their components and interpret the significance of the prevalence of those components in the general environment.*

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*An understanding of the structure of KPU units will make possible the selection and interpretation of useful social indicators.

Because the KPU goals and values held by different groups vary greatly and often are in real conflict, however, the identification of a unit from one perspective will often not match that from another perspective. Likewise, depending on the shift in perspective, descriptions of units will overlap, be contradictory, and sometimes leave gaps when brought together to create a whole picture.

Some order can be brought to this maze of conceptual units for seeing KPU by recognizing and utilizing the multitiered formal structure for organizing KPU management as one principle of the analytic framework.

The Ecology of KPU

In addition to characteristics of its parts and basic units the KPU infrastructure is a product of the environment, particularly its immediate environment. Again the case studies revealed a series of specific observations about this relationship.

1. KPU is subject to appeal by special interest groups and shifting coalitions within the political and social systems that are outside KPU.
2. By law KPU cannot be directly manipulated from the federal level except through incentives.
3. The fiscal incentives made available to federal KPU promoters are extremely limited.

The Domain of Inquiry

Thus, we came to a basic conclusion about the KPU infrastructure as a domain for inquiry, monitoring, and management. We should not assume that it is one system except by definitional tautology. It is a maze of components only partially ordered and often only connected by a shared environment. We thus agree with the following statement made in the recent NIE funding policy report.

System Qualities

> ... we want to comment on the degree of "system" that seems to exist. We have been impressed, even though we have far too little data, to find so little interrelation of parts. There is an aggregate of individuals, institutions, and other resources that combine and relate in a variety of ways to a variety of ends .... But it also reinforces our conviction that considerably greater effort must be put into mapping the pieces of the universe, understanding the diverse structures and their internal strengths, so that deliberate policy toward each part can be attempted, and so that potential connections and interrelations can be encouraged.

The analytic framework (National Institute of Education, 1975, p. 30) must be a method for constructing such descriptions.

Some of the more salient features of KPU that must be taken into consideration to develop an analytic framework to describe KPU sectors are listed below:

1. By starting with a focus on LEA and school site staff we were driven to trace back the lines of constraint and pattern of decision making of which these agents are only the final gatekeepers. The pattern behind these visible agents explains KPU outcomes, just as the bulk of an iceberg beneath the water explains why what is visible floats.
2. KPU is therefore hierarchically but not centrally controlled.
3. On the other hand a strategy has not yet been developed to manipulate the KPU hierarchy to serve specific goals. Therefore much of KPU is conducted laissez faire.
4. The image of educational KPU is highly unstable among both professional staff and laymen. Each shift in image brings a change in strategy.
5. Governance is not a simple process consisting of those who govern and those who are governed. We found that we had to consider governance, or regulation in the political sense, a complex process of negotiation between many different groups with

different positions in an authority structure, with different needs and perceptions of how those needs could be met, and with different resources at hand. Governance is diffused throughout the system with all agents having at least some discretion.

6. There are real sources of indeterminacy in the KPU infrastructure springing from the following sources:

   (a) The pecularities of human agents acting within their role-defined domains of discretion.

   (b) The limits of skill, intelligence, and forethought of human agents.

   (c) The diversity of goals and values.

   (d) The possibility of direct violation or ignorance of policy directives.

   (e) The lack of tools to act on or enforce policies.

   (f) The artificial nature and therefore potential contradition and ambiguity of policies.

Thus, overall, the cases show that KPU does not easily submit to simple preconceptions of how it works. It is necessary to look at KPU practice in some detail to construct a realistic model of how KPU behaves.

Expectations to Use as Design Criteria for the Analytic Framework

From the image of KPU developed through the case studies we derived the following system of expectations to use as design for the analytic framework. First we formulated expectations for the framework as a distinct methodology, second for the role of the framework if it is to serve as part of a monitoring program, and third for the specific principles that should constitute the framework.

The Analytic Framework as a Distinct Methodology

The framework itself would be best characterized as a metaguide to inquiry into the KPU governance structure just as the scientific method is a metaguide to inquiry into nature. Therefore, the framework should have as its conceptual base the way we can "know useful things" about the KPU infrastructure (not some specific template of that infrastructure). It must be able to cope with the indeterminacy and disorder actually found in KPU and do so in a systematic way. Unlike the physical scientist who assumes that nature is well ordered, the student of KPU cannot make this assumption about KPU.

Moreover when a scientist constructs a framework for inquiry into the physical world and oversimplifies the problem, nature is not in fact changed to conform to that image. KPU, however, is an artificial system that reacts to congressional mandates, shifts in public expectation, and major infusions of money. An overly simplified strategy for mapping KPU could lead to actions that narrow rather than broaden the range of change KPU produces. The practice system has been dominated by the search for the "one best system" long enough. To promote change, the KPU monitoring program must be able to identify and support even more variety than currently exists and to embrace even more variety as the education system becomes more pluralistic.*

While the analytic framework is to be designed to cope with the formally specified infrastructure, it should also be designed to leave room for eventual inclusion of the informal regulatory structure and for

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*This observation incidentally points to a basic flaw in conceptualizing the control-of-schools issue as a centralized-decentralized governance issue. Without adequate differentiation at the local level there is no need for central support; without central support there cannot be differentiation at the local level.

use in conjunction with the other facets of a programatic monitoring program.

The framework should provide a method for describing specific units of the KPU infrastructure relative to various purposes and do so in an efficient and cumulative way. This methodology should serve as a rigorous, consistent, and communicable tool for revealing the connectedness and pattern of KPU as it really is.

The Conceptual Role of the Analytic Framework in the Monitoring Program

Incidental to the formation of this system of expectations for the framework, we began to see their implications for a monitoring program. In turn these implications affected our expectations for the framework. We began to believe that the monitoring program must be designed to reflect the understanding of the substance and process of KPU and not simply of some highly abstract and general concept of monitoring. The monitoring program ought to be designed by looking at the details of the KPU process. Moreover, the program ought to have a built-in capacity to permit structural modification as the image and understanding of KPU develops.

In Figure 6 we present our image of a monitoring program in contrast to that seen in Figure 1.

Thus, in summary, the role of the analytic framework in a monitoring program is to:

1. Provide a strategy to ask "good" questions about how the infrastructure leads to particular KPU outcomes.
2. Provide rules for organizing answers into policy useful patterns that enhance KPU efficiency.

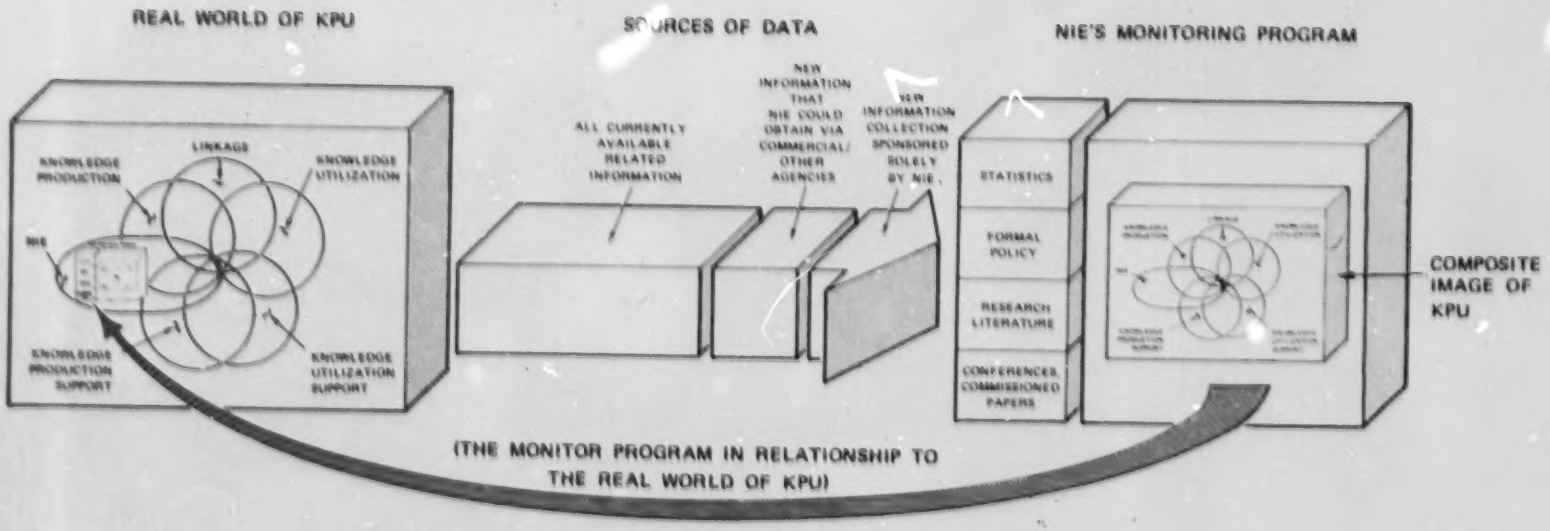

FIGURE 6 A SCHEMATIC VIEW OF THE NIE MONITORING SYSTEM

Expectations for the Specific Principles Composing the Analytic Framework

Earlier we mentioned that the framework ought to be able to produce realistic and useful descriptions of the KPU infrastructure. We are now in a position to use our image of the empirical reality of KPU and our expectations for our monitoring programs to explain what these mean in greater detail. Table 8 contains a simple outline of what we mean by realism and utility. We discuss these concepts below.

Table 8

CHARACTERISTICS OF AN EMPIRICALLY VALID ANALYTIC FRAMEWORK FOR INQUIRY

Realism	Utility
Comprehension • Complete • Complex • Integrative Balance • Among four primitives • Among three types of knowing • Social versus personal goals • Formal versus informal norms	Pragmatic usefulness • For a variety of purposes • Different levels of effort Communicability • Of results • Of paradigm

Realism--The most devastating critiques of the prevailing models of educational R&D used to map the KPU infrastructure are that the models sacrifice important real characteristics of KPU in order to have logical simplicity, or mechanistic linearity, or some other type of conceptual

neatness. This sacrifice is a mistake not because it is an attempt to find ways to conceptually simplify a complex field; the mistake is in using, a priori, a simple conceptualization as a sort of procrustean bed for understanding KPU. In fact, rather than applying a model to KPU, a paradigm is needed to abstract models from the empirical reality of KPU. To be realistic or valid that paradigm should be molded to exhibit two particular properties: comprehension and balance.

By comprehensive we mean that a realistic framework must have the ability to take advantage of or incorporate all elements which may be important to explaining different KPU events. The shift from educational R&D was one shift in this direction, showing that dissemination and adoption activities needed attention as well as research and development. Currently there is pressure to incorporate the concepts of linkage and utilization into the basic linear model.

Our suspicion is that even this is just the beginning of expansion of the basic model. KPU is a small sector of the $100 billion a year American education industry. KPU as an industry is only beginning to take shape. A strategy to model that industry must have room to incorporate much more complexity and variety as the industry develops, otherwise the models will continually fall under their own weight.*

Therefore for the framework to lead to comprehensive models it must answer questions in three areas (see Table 8). Does the framework produce descriptions of KPU that are complete, appropriately complex, and adequately integrative?

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* The capacity to cope with variety is especially necessary when we observe that the goal of KPU is eventually to anticipate, not just respond to necessary change. KPU must make possible more varied responses in the education system and not limit responses to those easily modeled.

By balance we mean that a realistic analytic framework must balance its treatment of the effects of the different factors in KPU. In this case four dimensions are of particular concern (see Table 8): the role of formal versus informal norms and policies, the role of social versus personal norms, the role of three ways of "knowing" a KPU (parts, whole, and ecology) and the role of policies versus that of agents, resources, and activities. These elements comprise the primitive components of KPU.

As we interpreted the purpose of this project it seemed that the central task was to focus the bulk of our efforts on determining the role of formal policy in regulating KPU behavior. In this sense our efforts were unbalanced. However, as the reader can see from the preceding paragraph, this is only one type of norm regulating system behavior; moreover, norms of all types are only one of the characteristics of configurations that effect configuration behavior. Thus we left room for development of these other dimensions as we designed the basic structure of our framework.

Utility--It is not enough that the framework be capable of supporting realistic and logically valid descriptions of the KPU infrastructure. Both the descriptions and the framework that produces them must have pragmatic utility or value. This utility must be of two basic sorts: practical usefulness and communicability (see Table 8).

By practical usefulness we mean that the framework must facilitate understanding of KPU configurations in cost-effective ways that are relevant to policy planning and can lead to better decision making. For the framework to be facile in this way it must produce conceptual configurations that reveal valid policy-relevant implications, do so effectively, and meet a wide variety of analytic problems faced in policy planning and assessment.

By communicability we mean two distinct things. First, we mean that the configurations and policy implications that are produced by using the framework are communicable. That is, it must be possible to present the results of an analysis to a policy maker in a coherent understandable way. It is not enough for the policy-related results of analysis to follow validly. It is important to be able to show that they follow validly.

Second, the analytic framework itself must be communicable. How easily can the paradigm be taught to other individuals? How can the paradigm be incorporated into policy planning procedures of NIE or any other agency?

III AN ANALYTIC FRAMEWORK FOR GUIDING DESCRIPTIONS OF THE KPU INFRASTRUCTURE

Overview of Section III

In this section we present the analytic framework as a response to the expectations it must meet. These expectations are dictated by the KPU reality and the practical limits of a monitoring program. The analytic framework is a method for guiding inquiry into KPU in education tailored to capture the salient features of the KPU infrastructure. These features are clustered into three sets; those pertaining to the elements and basic relationships that compose the infrastructure, those pertaining to the "wholes" in the infrastructure, and those pertaining to the relationships between "wholes" and their environment. In each of the three cases the most notable sources of indeterminacy are presented. The final portion of this section presents two taxonomies that make the framework easier to use and an approach that makes the framework teachable.

The Analytic Framework: a Gestalt

Based on the preceding argument we decided that the framework should be a strategy for concept formation where the subject of the concepts is the KPU infrastructure. In this respect we will call the basic unit of understanding configuration. Configurations are conceptualizations of the KPU units. They are the descriptions of particular KPU phenomena constructed to bear the highest possible correlation to the logic in use as seen from a particular perspective to serve a particular purpose.

The features and distinctions used to construct configurations can be conveniently grouped into three types; the first pertain to the parts and relationships that make up the "whole," the second pertain to the whole that make it more than the sum of its parts, the third pertain to the whole as part of a larger environment.

We will say simply that the framework must help promote investigating, knowing, and understanding a KPU configuration by

- Recognizing its parts or components and the ways in which they are related.
- Recognizing the emergent properties that make the "whole more than the sum of the parts."
- Recognizing the relationships between the unit being configured and its environment.

There is a great deal of difficulty in drawing objective boundaries around social enterprises--saying what is within a configuration and what is in its environment. But the difficulty dissolves when the choice is left entirely up to the analyst as guided by his analytic purpose. The boundary distinction then rests on the criteria he or she uses to value components for inclusion. The boundary thus drawn is neither true nor false, merely more or less useful.

Boundaries of configurations (like those of any concept) are therefore merely artifices. We draw them to limit a description and to arrange elements economically and usefully. They are highly permeable lines of demarcation. There is no hard and fast rule for defining boundaries other than the general considerations of usefulness.

The purpose of the analyst has become the central standard by which investigation and adequacy of description are to be measured. The purpose of analysis* takes its central importance because it is the "value" that enables the analyst to distinguish what is the subject of his inquiry and to sort the focus of attention from the surrounding field.

We have chosen to call the subject matter of a configuration the focus of analysis. This focus of analysis is distinguished from the surrounding field of analysis by the purpose of the analyst.

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*Note that the purpose of analysis we are using here is the purpose of the analyst, not of the KPU agents being studied. Organizing analysis around hypothetical purposes of KPU agents such as RDDA is like seeking diagnosis for one's own ills by reporting someone else's symptoms.

Sources of Indeterminacy

Before we explain the principles of the analytic framework that are suitable to guide the three sorts of inquiry into configurations, we wish to point out that there are two fundamental sources of indeterminacy that will plague each and every attempt at description.

The first source of indeterminacy has to do with the profound limits of mankind's basic tools for description: logic and language. When dealing with complex man-made systems, from mathematics to language to systems of social choice, attempts at complete, consistent, and realistically complex description always turn up irreconcilable paradoxes in the descriptions themselves--declarations or descriptions constructed with perfect fidelity to the rules of reason but mutually contradictory. This first type of indeterminacy plagues every tool of inquiry man has designed. The limits of the tool should therefore be understood so as not to be confused with real limits in the reality studied.

The second source of indeterminacy is much more common and of more immediate concern. Some of the features of KPU components are unpredictable either because we haven't the skill or resources to make them predictable or because the phenomena under study is a source of idiosyncratic behavior. (For example, the specific next act of a human being is not reliably predictable. Faced with a policy directive, a person has many options within the scope of the policy as well as the option of doing the forbidden.)

In each of the following sections we briefly discuss the kinds of indeterminacy that must be coped with in that type of description.

Parts of Configurations

The real world observables in any KPU focus of analysis are agents, resources, policies, and purposive activities. From these we infer patterns and flows of influence, and deduce cause and effect.

The primitive components of KPU are agents, policies, purposive activities, and resources. With these four components we found it possible to complete a realistic description of any KPU configuration. These four

components are not merely convenient constructs like those of "RDDA" but have unambiguous referents in the real world. It may be argued whether a particular agent (person or institution) is a KPU research agent, but the existence and identification of an agent is subject to physical determination. Likewise, while individual policies may or may not apply to specific KPU phenomena, the existence of formal policy and its formal interpretation is usually straightforward. Where it is not, systems of due process exist to remove any dysfunctional ambiguity. Resources (materials, physical plants, money, information, and the like) and purposive activities (selecting textbooks, running a regional lab, and the like) share the same sort of physical unambiguity.*

The ambiguity comes in determining their relevance to KPU and, as we have argued, relevance should be determined relative to the analyst's purpose.

It was proposed by several reviewers that a fifth component, namely media, needed attention. We considered this possibility but, while endorsing the idea that media must be accounted for, rejected it as a distinct component.

> There are explicit communication patterns within the system that we call media; these include the carriers of policy and informal criteria. Agents, policies, resources, activities and their patterns are the media for information regulating KPU.

Agents

Agent is a generic term used to identify both individuals and organizations at any useful level of aggregation. Agents are identified by reference to their location and their formal KPU roles.

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*Because we found time to be more usefully conceptualized in KPU description in other ways we do not treat it as a resource. It is rather a type of constraint that can be taken advantage of (e.g., shifting deadlines, sequences) but cannot be manipulated directly the way resources can.

Policies

A policy as a part of a configuration is a decision rule.* In this case we focused on formal policies. It is evident that policy is only one of the "things" to know in order to "know" a configuration. However, configurations may theoretically by knowable by looking only at formal policy if there is sufficient information redundancy in KPU policies. That is, if policies are not only decision rules but also symbols of agreement, records of structure, and the like, then looking at formal policies may be enough to map some configurations.

Policies are symbols of action in three ways. Policies are set, enforced, and implemented.

> We make a distinction between three roles of policy: policy setting, policy enforcing, and policy implementing. Policy setting is carried out by agents who make policy; enforcing is done by those agents either so designated in a policy to ensure compliance or through various informal sanctioning powers; and implementing is the doing of goal-oriented activities within degrees of freedom set up by some policy(s).

Recursion enters here because setting and enforcing are often types of implementing. Thus the policy process must be relativistically described. How the distinction is applied is determined by the boundaries of the foci and field of analysis at the given stage of inquiry.

We found ideas of setting and implementing the most useful to identify relevant policies and classify their effects. "Enforcing," however, is a major source of indeterminacy in describing policy. Why a policy is effective as a decision rule is largely determined by informal incentives and constraints.

> There are informal influences that may be more significant than formal policies in regulating KPU. Formal policies often permit a wide latitude of discretion for implementers that is narrowed by these influences. This concept is included to allow further expansion of the framework to a

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*Policies also pertain directly to whole KPU configurations (e.g., by-laws of a research lab) and to overall relations between configurations and their environment (e.g., copyright).

more generally useful and realistic understanding of behavior in a policy-regulated social system.

Purposive Activities

The activities we are concerned with are those which have a KPU purpose as at least one of their motives. Because many activities in this field are intended to promote change and break educational stereotypes from the past, it is very difficult to build a descriptive typology of activities that does not reify the categories and thereby limit description of the variety that exists in the real world.

Activities exhibit the property of process in time. Therefore we found it desirable to distinguish how time should be used to describe activities. In the first place, activities evolve. The basic task changes with history. Second, and more important for short-term projections, the activities that contribute to a configuration are typically ordered in some sequence and bear a time sequence among them that is necessary to their smooth contribution to the whole.

> Several concepts of time are necessary to describe the parts of configurations. First, activity sets evolve through time; the functions of organizations change as goals and objectives are redefined. Second activities are often rearranged in sequences.

Treatment of the time sequence of activities suggested the next major distinction to be made in the analytic framework; that between an activity and the component activities that make it up.

> It is sometimes useful to make a distinction between activities and levels or stages of activities. Policies that govern KPU programs frequently make this distinction--various subactivities are prescribed to be performed parallel or in sequence. Within organizations, various bureaus carry out activities that contribute to the main purposive activity(s) of that organization. This distinction creates the necessity for concepts of hierarchy for agents, activities, and policies.

It is this notion, that activities occur as stages of larger activities and in turn are composed of stages of smaller activities, that we found most useful in developing ordered aggregation and disaggregation of KPU wholes.

Resources

Resources are constraints; material, energy, and the like that arise from the physical world or are information about that world. They are the stuff of which KPU units in the real world are built. Because they act on KPU in a different way from policy we did not spend our efforts on elaboration of their role. We did, however, attend to how policy affects the allocation of resources.

In summary, a disaggregated configuration is composed of "smaller" or component configurations and/or a set of agents (with roles defined by formal or informal norms), organized to conduct a purposeful activity and "related" in four ways:

1. By shared formal and informal policies (including those which define agent roles).
2. By exchanges of resources.
3. By exchanges of information, and
4. By a shared environment.

Fundamental Sources of Indeterminacy in the Parts of Configurations

The principal sources of indeterminacy in describing the parts of configurations arise from two sources: agents and policies. Agents are sources of indeterminacy in that they are roles played by people. People have their limits and flaws as a source of indeterminacy, but more importantly they always act within some range of discretion even when they are "going by the book." Moreover there is no guarantee that they will go by the book and often they choose not to.

Policies are a source of indeterminacy because they are a set of man-made rules which are not of necessity complete or consistent. Policies often are ambiguous, misinterpreted, and deliberately vague. They are based often on real value conflicts and are sometimes legitimately interpreted in one way today and in the opposite way tomorrow.

Configurations as Wholes

A configuration is a whole that is more than the sum of its parts. It is identified as a whole principally for one or more of three reasons of interest to us:

- It is treated as a whole by some formal policy (it is formally recognized as one thing).
- It exhibits emergent properties that are not merely aggregates of the parts (such as one coherent purpose or integrated set of purposes).
- From the perspective and purpose of the analyst it is conveniently treated as one unit to promote understanding and communication.

We generally found it possible to locate an important policy that, implicitly at least, marked distinctions to use in identifying wholes. In general such policies specify a particular purposive activity that is the characteristic emergent property that delineates a whole (e.g., curriculum development).

The treatment of wholes required adding several conceptual tools to the analytic framework. First is the idea of hierarchic conceptual ordering. In discussing parts we labeled one type of part "purposive activity." When organized in a configuration a set of activities arranged in the appropriate sequence can be conveniently conceptualized as one activity (just as the actions of 22 men on a football field in a down constitutes one play). This opens the door to recognizing that the KPU infrastructure is aggregated hierarchically. What is seen as a series of parts by one actor is considered as one thing by another. To cope with this problem of hierarchic aggregation we used "stages of activity." Each configuration can be said to be organized around one activity (e.g., textbook selection). That activity is composed of some sequence of smaller activities at a lower hierarchic level and each of those activities can be used to identify a configuration at that level. Likewise each activity is part of a larger activity at a higher hierarchic level, and that higher level activity can be used to distinguish a configuration.

Second, configurations as wholes not only share the evolution property of time as do their parts but also require adding a new dimension of time to the framework. Whole configurations often exhibit the property of cycles in time. Some have developmental life cycles, while others perpetually reiterate the same pattern in time. Hence time applies to whole configurations not only as evolution but also as cyclic.

Third, policy is not simply a component of configurations; it can take whole configurations as its object.

> In terms of what is known about configurations as "wholes," the principal characteristic of configurations is their emergent human purpose. This purpose need not be singular and usually is not. (Configurations have such purposes as survival and security as well as the pursuit of particular acts such as research, development, dissemination, or adaption.) Finally, whole configurations are the objects of some policies.

Fundamental Sources of Indeterminacy in Configurations as Wholes

There are two fundamental sources of indeterminacy in describing configurations as wholes. The first is a subtle and debated point in the philosophy of scientific inquiry, namely, that the emergent properties of a whole cannot be deduced from properties of the parts. This means that we can expect wholes to exhibit properties only visible by examing the whole. Often these properties are exhibited only when the whole interacts with its environment. The problem of indeterminacy arises because the higher the whole is in our conceptual system (as we focus on larger and larger wholes) the harder and riskier it is to manipulate it experimentally and the fewer are the number of instances to observe and compare without manipulation (e.g., while there are millions of classrooms and tens of thousands of districts there are only 50 SEAs and one Congress).

The second source of indeterminacy about wholes is their purpose, or set of purposes. The purpose is deliberately vague. The system is regulated by successively dividing up the domain of discretion and allocating parts of the domain to lower aggregation levels. Put another way, higher order purposes and goals are abstract symbols of a range of acceptable specific outcomes. Therefore purposes of whole configurations are somewhat

ambiguous by deliberate intent. Moreover, at every hierarchic level there is real conflict about both goals and means. One reason for hierarchic structure is to resolve only those issues that must be resolved at higher levels. This must be done in a sufficiently ambiguous way so that the concerned constituency will not split into warring factions and yet in a sufficiently specific way to enable lower level configurations to act in coordinated fashion.

Configurations and Their Ecology*

The final set of conceptual tools we added to the analytic framework were generated in response to the fact that KPU configurations are always found within a larger environment and often that environment accounts directly for the behavior of the configuration.

The environment affects configurations both at the level of its parts and at the level of the whole. The environment is a major source of people, resources, and policies that are or affect parts of configurations. On the other hand, the environment creates a niche for the whole configuration and is a source of policies aimed at the whole. Because the environment evolves through time, the constraints and expectations it makes on configurations change (e.g., Sputnik in the 1950s, the "Great Society" in the 1960s). Finally the bulk of the informal norms and policies that affect configurations and the majority of the physical parameters that constrain the configuration are considered to be part of the environment.

But the most significant new concept that must be added when we include environment in our thinking is that the environment may be the major media by which two configurations communicate. This does not make the environment part of a larger KPU configuration any more than communication by phone makes the phone system part of KPU. The environment provides paths "outside" KPU between KPU configurations. In fact it might be plausibly argued that KPU is a set of pockets of activity connected only by a non-KPU environment.

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*Ecology is used rather than environment to stress the connectedness rather than the distinction between a configuration and its surroundings.

This should not necessarily be considered a flaw. Such isolation would allow radically contradictory ideas to exist within the same society in peaceful coexistence rather than continual conflict or forced resolution through compromise.

> From the standpoint of how configurations are to be known relative to their environment they have several features. By using the "purpose" of the configuration, it can be seen as a focus within a field of various forces. Where the configuration is tightly knit into a larger configuration, one dimension of its environment can be shown by picturing the configuration as one stage of this larger configuration. (Conversely, when a configuration is composed of several "smaller" configurations, it may be useful to show these as stages of the larger configuration.) The ways in which configurations "relate" to one another or with or through the environment is by an exchange of those same elemental components that make up a configuration (namely exchanges of agents, resources, information, etc.)

Fundamental Sources of Indeterminacy in Configurations in an Ecology

Two sources of indeterminacy in describing a configuration arise from its environment. The first is that from the perspective of KPU the major changes in the larger environment must be taken as unpredictable shifts in parameters. Monitoring KPU itself will not anticipate these although it might detect early impacts of such changes on KPU. However, if KPU is to anticipate changes in the larger society in order to have adequate lead time for reaction, the moritor will have to reach outside the domain of KPU.

The second source of indeterminacy is the effect of the environment on messages between KPU sectors when the environment is the media.

Summary of the Paradigm

The following outline shows the key ideas and principles which make up the analytic framework. Because the framework is a strategy for guiding inquiry into and for concept formation about the infrastructure of KPU, the purpose of analysis established by the analyst provides the standard or cutting edges for making distinctions and drawing connections

and inferences. The first distinction the analyst makes is between the focus of his interest and its surroundings. The second distinction is to what extent he will examine the parts, whole, or environment of the configuration. The remainder of the framework is a set of principles to organize these three kinds of inquiry.

SUMMARY OUTLINE OF THE ANALYTIC FRAMEWORK

A. The analyst selects and refines a purpose of analysis which serves as the standard for making necessary distinctions and assessing the progress of the analysis.

B. The analyst distinguishes (based on his purpose of analysis) between the focus of his investigation and field of phenomena in which it is found.

C. A conceptual configuration of the focus with three types of features is elaborated as needed to satisfy the purpose. These features include:

1. For parts of the configuration
   a) Agents, resources, purposive activities, and Policies. (Policies are characterized by being set, enforced, and implemented.)
   b) The four basic components and the patterns they form are the media or communication system of KPU.
   c) Informal and personal norms outweigh formal policies in determining the specific choices of KPU agents.
   d) Time marks the parts of configurations in two ways. They evolve and they may be ordered in some sequence.
   e) Specific KPU activities can be usefully treated as stages of larger KPU activities.

2. For configurations as wholes
   a) A configuration is a whole for monitoring purposes if:
      (1) A formal policy treats it as whole
      (2) It has distinct emergent properties
      (3) For the given purpose of analysis it is sensible to treat it as a whole.
   b) The activities used to distinguish full configurations are best treated as hierarchically nested.
   c) Whole configurations often have characteristic cycles in time.
   d) Policies are not merely components of configurations but may take full configurations as their target.

3. For configurations within an ecology
   a) The environment influences a configuration both through the parts and the whole.
   b) The non-KPU environment provides media through which KPU information flows.

The advantage of this analytic framework is that it allows a researcher to study units and form configurations without conceptually destroying the unit (as summary statistics do) in the process and forcing information into procrustean molds or categories.

The analytic framework is a first attempt to form a methodology to produce systematically a reconstructed logic of KPU that is congruent with the logic in use. It does not try to force/reify systems logic as the logic in use.

Final Taxonomy: a Guide to Policy Inquiry

We developed two taxonomies, one of available types of policy archives and what they contain, the other of configuration-relevant terms and concepts to help organize the questions analysts should take to the policy archives and other information sources.

Taxonomy of Policies and Their Archives

This taxonomy and discussion was organized to show the range of laws and public policy regulations which are perceived to have relevant impact on the way in which KPU is carried out and how innovations are implemented in education systems (see Table 9). Secondly it is intended to provide some information about how policies are made and where they are stored in legal and other archival systems.

Taxonomy to Guide Policy Search

While most policy is recorded in accessible archives of one sort or another, there is a serious problem in locating the right archive and the right index term to retrieve the item. Moreover, organizing the overall search to make it effective and complete requires some planning. The second taxonomy is aimed at helping to meet these needs.

The taxonomy is basically a checklist structured so that an analyst can use the following four general pieces of information in his configuration to identify specific policies that might be important to the configuration:

Table 9

A LEGAL TYPOLOGY OF POLICY

Type of Law	Type of Policy	Definition
Constitutional	Constitution	A system of fundamental laws or principles for the government of a state, society, corporation or other aggregation of individuals. A constitution is always written and incorporates as its own all final individual decisions made by courts of law based on its construction. This concept embodies not only those documents widely recognized and called constitutions, but also the statement of purpose and fundamental law of any unit of formally grouped agents.
Statutory	Enactment	A statement passed by vote of a representative body in accordance with its constitution, which may require, permit, or prohibit particular actions.
Administrative	Regulation	A statement issued under delegated authority originating in and for the purpose of carrying out an enactment, which may require, permit, or prohibit particular actions.
Administrative	Guideline	A formally unenforceable statement intended to suggest desirable conduct.
Administrative	Discretionary Act	An act conducted with no control other than the actor's judgment, within a decision zone which may be bounded by constitutions, enactments, regulations, or any combination thereof.
Contract	Contract	A legally binding agreement to do, or refrain from doing, a particular act.
Case	Common Law	The body of principles and rules relating to the government and the security of persons and property which are not enactments and which derive their authority solely from usage over [illegible] and judgments of the courts upholding them.
Case	Order	The statement of a judicial or quasijudicial body, often ascertaining the existence of specific facts, issued under the authority of a constitution, an enactment, or both, and requiring, permitting, or prohibiting particular actions.
Statutory	Plebiscite	The outcome of a popular vote, at whatever level, however conducted, that leads to legally binding rule.

- What is the source of policy? Who (i.e., what agents in the configuration) could be the formal proximate author of the policy?
- Who are the enforcing agents (if any) and what enforcement mechanisms (if any) are provided?
- What might be the target of a given policy? To what purposive activities, agents, resources, and/or other policies might a policy apply?
- To what superordinate policies is a known related?

Figure 7 shows the basic structure and the general categories of the policy locating taxonomy.

The following comprised a locational descriptors master list:

- Federal
- State (by name)
- Region*
- County
- District
- School
- Learning setting (e.g., classroom)
- Nongovernmental

Complementing the locational descriptors list is a parallel role descriptors master list.

- Legislative Section
  - Legislatures
- Judicial Section
  - Courts (by name if appropriate)
  - Actorneys General

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*Regions are bounded in different ways for different KPU purposes. For example, there are 17 Boards of Cooperative Services in Colorado; each has its own name and serves a specific geographical region. On the other hand, a different set of regions is used by the Colorado Department of Education for assigning responsibility to state department actors who consult with and assist local and regional education agencies within that larger region.

1.0 POLICY NAME (e.g., LEGAL REFERENCE)

2.0 POLICY SOURCE

- 2.1 AGENT
  - 2.11 LOCATIONAL DESCRIPTORS
  - 2.12 ROLE DESCRIPTORS

3.0 POLICY ENFORCEMENT

- 3.1 AGENT(S)
  - 3.11 LOCATIONAL DESCRIPTORS
  - 3.12 ROLE DESCRIPTORS
- 3.2 ENFORCEMENT MECHANISMS

4.0 POLICY TARGET (POLICY IMPLEMENTATION)

- 4.1 AGENT(S)
  - 4.11 LOCATIONAL DESCRIPTORS
  - 4.12 ROLE DESCRIPTORS
- 4.2 PURPOSIVE ACTIVITIES (BY NAME)
  - 4.21 GENERAL KPU MANAGEMENT*
  - 4.22 RESEARCH
  - 4.23 DEVELOPMENT
  - 4.24 LINKAGE
  - 4.25 UTILIZATION
- 4.3 RESOURCES (BY NAME)

5.0 SUPERORDINATE POLICY(S)

- 5.1 OTHER POLICIES (BY NAME)

*These five categories are to be used only where activities can be clearly designated as one or another.

——— Both Categories must be Used - - - More than One Category may be Used

FIGURE 7 STRUCTURE OF THE POLICY TAXONOMY

- Executive/Administrative
  - Federal education agency (FEA)
    Department of Health, Education, and Welfare (HEW)
    Assistant Secretary for Education (ASE)
    National Center for Education Statistics (NCES)
    U.S. Office of Education (USOE)
    National Institute of Education (NIE)
  - U.S. Executive (President, Executive Office)
    National Council on Educational Research (NCER)
    Office of Management and Budget (OMB)
    (Other federal agencies having KPU-related roles--by name)
  - State education agency (SEA)
    Secretary of Education
    State Board of Education (SBE)
    Chief State School Officer (CSSO)
    State Department of Education (SDE)
  - Governor and executive offices
    (Other state agencies having KPU-related roles--by name)
  - Regional education agencies (administrative and service)
  - County Departments of Education
  - Local education agency (LEA)
    Local Board of Education (LBE)
    School District Administration (superintendent and assistants)
    School Administration (principal)
    Department Administration (department head)
    District/School KPU specialists
  - Formal linkage agents
    KPU information centers or systems
    Teachers centers
    Education extension agents (EEA)
    KPU personnel training institutions (schools of education)
  - Formally established KPU advisory groups
  - Formally established accreditation groups
- Advocacy Section

  Interest groups and ad hoc groups
- Other and Nongovernmental Section
  - Professional associations and consortia
  - Professional media
  - Research and testing institutions

- Material producing institutions (including publishing houses)
- Academic institutions (colleges and universities)
- Education research and development laboratories and centers
- Philanthropic foundations
- Teachers
- Students

Summarizing Policies Using the Two Taxonomies

To provide a ready reference to the main policies in any topic, we combined the major features of the two taxonomies. Under five headings, a tabular listing at the end of each topic summarizes each of the major policies that are most visibly important to the governance of agents, activities, and so forth in that particular configuration. The five headings are:

- Policy name: the formal title of a policy (e.g., U.S. Constitution, Elementary and Secondary Education Act of 1965, Board of Cooperative Services Bylaws, and so forth).
- Reference citation: the legal citation (if any) for the policy (e.g., Amendments Ninth and Tenth to the U.S. Constitution, Article 40 of the New York State Education Code, and so forth) or the issuing body if no formal citation is possible (e.g., Office of Curriculum Development of the School District of Philadelphia, and so forth).
- Type of policy and process of generation: respectively, the are the same categories defined in Table 9 for type of law and type of policy.
- Policy source: The location and role name of the issuing body as per the locational and role descriptors master lists above.
- Explanation of significance to the topic at hand: a summary of policy targets, including the major agents, activities, and resources governed by the policy being described.

The taxonomy completes the paradigm for describing and summarizing KPU governance.

A Method for Mastering the Analytic Framework as a Set of Skills

While the preceding presentation concerned what the analytic framework is and how it came to be, the goal of this section is to present a strategy to make the framework communicable as a set of skills.

A Protocol of Procedures for Using the Framework

To maintain continuity among our staff who conducted specific case studies, and to ensure that the framework would be useful to others (e.g., at NIE), we developed a set of explicit procedures for using the analytic framework. Two of the case studies were mounted near the end of the formation of the analytic framework and as a result best show how it may be used in practice. These are Case Studies I (dealing with NIE allocations policy) and IX (dealing with the pilot state dissemination experiment involving educational extension agents).

The four main steps of the protocol are schematically shown in Figure 8. Like the scientific method, using the framework for concept formation about the KPU infrastructure is part technique and part art.

> Step 1: Select and write the purpose(s) of the analysis or inquiry for which the analytical framework is to be used in as concrete a manner as possible. (Some different kinds of purposes are discussed on pages 40 and 41.) The statement of purpose is crucial as it sets up the heuristic decision rules for using the framework; it must be refined, however, as subsequent steps are taken.

Selecting a purpose of analysis for the analytic framework is similar to selecting a new line of investigation in the physical sciences. It is largely a matter of art, intuition, and the curiosity or felt needs of the investigator.

> Step 2: Tentatively identify the focus of analysis, for example, a given agent, policy, activity, resource, problem, or issue--the target of the first step above--and the field of analysis, for example, the set of agents, activities, and/or policies that will be considered as the bounded context within which analysis will be done.

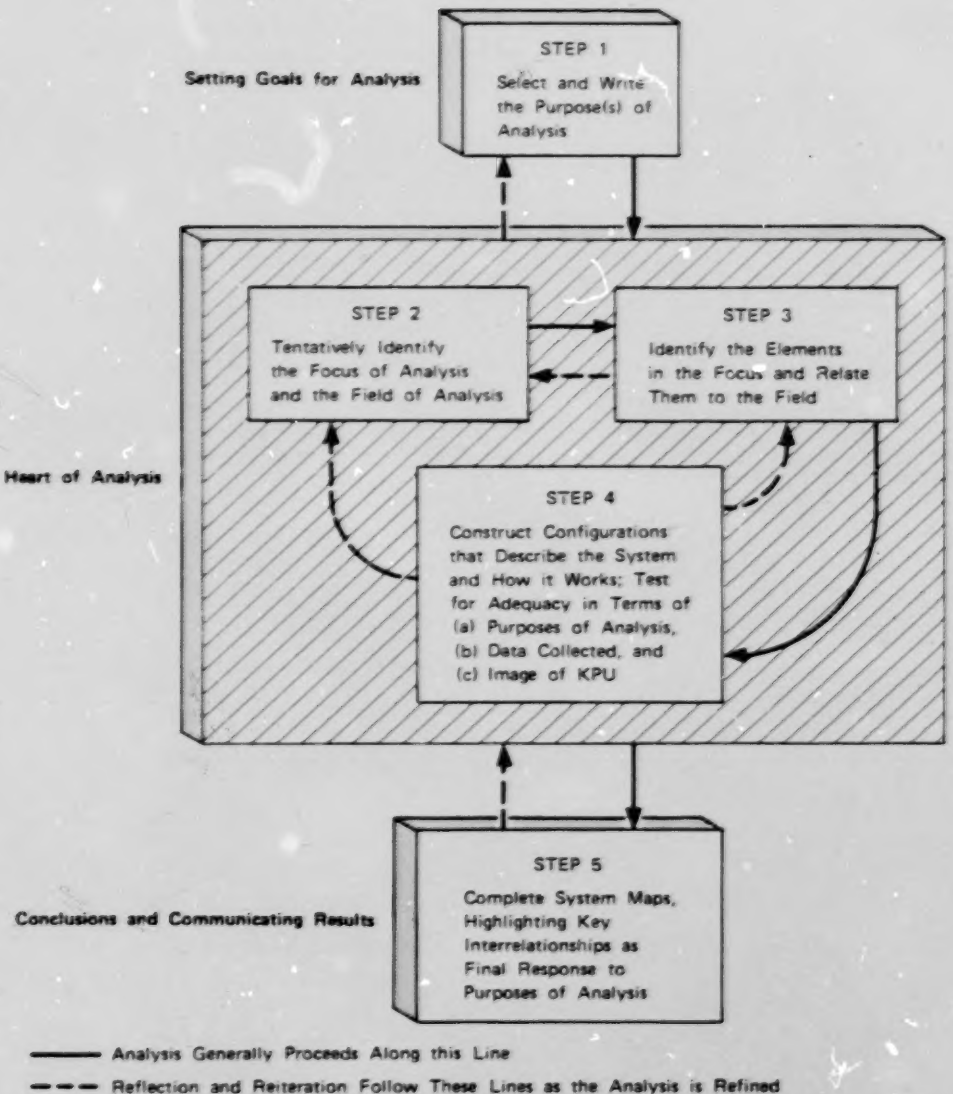
Setting Goals for Analysis
STEP 1
Select and Write the Purpose(s) of Analysis
Heart of Analysis
STEP 2
Tentatively Identify the Focus of Analysis and the Field of Analysis
STEP 3
Identify the Elements in the Focus and Relate Them to the Field
STEP 4
Construct Configurations that Describe the System and How it Works; Test for Adequacy in Terms of (a) Purposes of Analysis, (b) Data Collected, and (c) Image of KPU
Conclusions and Communicating Results
STEP 5
Complete System Maps, Highlighting Key Interrelationships as Final Response to Purposes of Analysis
Analysis Generally Proceeds Along this Line
Reflection and Reiteration Follow These Lines as the Analysis is Refined

FIGURE 8 OUTLINE OF THE ANALYTIC APPROACH

Selecting a focus of analysis is analogous to formulating a hypothesis in the physical sciences. It is the prudent generation of a rule for sorting matters of central concern from their surroundings.

> Step 3: Identify the elements, that is, the agents, policies, resources, and activities making up the focus of analysis; relate them to other elements in the field to establish tentative relationships between and among them, for example, the agents responsible for activities through policy setting, enforcing, and implementing; and sequencing of activities in time.

We found investigative reporting and searching policy archives the most useful methods for carrying out Step 3.

In each case, the underlying strategy is to start with some basic and known component in the configuration and trace outward the connections and other components of the configuration. Invaluable tools in this process were the two taxonomies and a guide to legal archives we developed.* The most serious limits to this process are the limits of codification of local school policy. However, this is rapidly changing in some localities.†

> Step 4: After making this "first cut" at the significant elements, construct configurations that describe the system and how it works. Guide and test the adequacy of these configurations against (a) the purpose(s) of analysis (return to Step 1 and clarify the purpose if necessary); (b) the empirical evidence (using KPU literature, legal and policy archives, interviews, and the like); and (c) the analyst's tentative image of the system (part of which is the underlying theory or model which the analyst thinks is appropriate).

At this point in time, Step 4 requires more art than science. Mapping the connections and elements uncovered in Step 3 requires a great deal of judgment. However, a variety of organizing techniques do exist which help in this task. Some of these are discussed in our interim report.

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*This guide is presented in the last section of the bibliography in Section V of this volume.

†We recommend that NIE mount a study of the rapid growth in services to LEA's to help codify their policy and keep them abreast of education law (see Section IV, No. 26-C).

Step 5: Finalize significant portions of configuration maps according to the initial purpose of the study, highlighting interrelationships between elements so that conclusions are clearly drawn and justified as the final response to the important data that were collected in previous steps.

This is the stage in which the analyst assesses what he has accomplished and decides next steps (e.g., do more data collection, reconfigure the data, draw out new implications, or stop).

Together, the protocol and the framework provide a systematic approach through which to inquire into any part of the KPU system. What role they might play in support of a monitoring program will depend to a large extent on the characteristics that are designed into the program.

Our recommendations, based on what we learned in this study, are presented in the following section.

IV DISCUSSION OF RECOMMENDATIONS

To sensibly present our recommendations we first review NIE's objectives for the monitoring program and then discuss several issues we believe should be addressed by NIE before any serious design work for an operational program is initiated.

Objectives of the Monitoring Program

The principal objectives of the monitoring system to be developed by NIE according to NIE's position paper "Building Capacity for Renewal and Reform," and the Request for Proposal (RFP) leading to this study are:

1. To achieve an understanding of the process of knowledge production and utilization in education. This objective is fundamental to the success of other objectives of the Office of R&D Resources, and indeed, to the achievement of all NIE objectives.
2. To provide the data base needed for policy analysis. Such a data base would (1) provide an early warning system to identify problems requiring policy initiatives, (2) assist in weighing policy alternatives by supplying data on the context of decision-making and the predictable impact of policy alternatives, and (3) provide feedback on the consequences of policy initiatives.
3. To provide for public accountability. The establishment of a system for monitoring KPU will provide a "feedback loop" permitting judgments about the impact of NIE initiatives--those designed both to improve the nation's capability for conducting educational research and development and to change educational practice directly.

In the process of rationalizing this program initiative, the authors of "Building Capacity for Renewal and Reform" further noted:

> Before we can determine how best to intervene to improve the system, we need to develop a much better understanding of system dynamics.... To understand the KPU process,...we need to know a great deal more about the system indicators.... The concept of "monitoring" is borrowed from the literature on social indicators. That literature was originally focused largely on the identification and measurement of outcomes at a macroscopic level. More recently it has come to emphasize the need to conceptualize models of society or significant social subsystems and to use the models to identify the variables in all parts of the system. As they are concerned with the dynamic interaction between model elements and the measurement and understanding of change, the indicators must be time-series. Once the interrelationships in the model have been established empirically, monitoring change in the variables becomes a means of anticipating change in other parts of the system. As development of such a model is a very long-term goal, it must be approached through a process of successive approximations. Even so, a beginning must be made.
>
> Task Force on Resources Planning and Analysis (1973), pp. 65 ff.

Underlying Issues

While the objectives discussed above are appropriately general, given that they formed the initial statement of a policy position, they must be translated into more detailed specifications before the design of an operational monitoring program will be feasible. And, for this translation process to take place, there are (at least) four issues that need to be addressed by NIE:

1. The degree to which NIE's monitoring program will be based on any given conceptualization or paradigm as opposed to being based on a deliberate or haphazard mixture of conceptual approaches.
2. The degree to which NIE will try to rigorously articulate (i.e., codesign and coordinate) its monitoring program and its other governance functions.
3. The degree to which new knowledge will be conceptually limited to include only that which results from processes and/or products of the institutionalized KPU system.

4. The degree to which data needs and data collecting activities of other agencies (particularly at the state level) will be explicitly considered in the design of the monitoring program.

A variety of alternative conceptions exists, not only regarding the "proper" way to conceive of or understand such complex societal systems as KPU in education, but also how they should be monitored and governed. The authors of NIE's position paper "Building Capacity for Renewal and Reform" recognized this fact when they recommended that a conference be held on alternative conceptualizations of the knowledge production and utilization system (Task Force on Resources Planning and Analysis, 1973, p. 69).

The monitoring objectives specified in NIE's position are representative of an essentially systems-oriented conceptualization that leads to the notion of an "external KPU monitoring system" to be developed by NIE. A contrasting conceptualization that illustrates how different conceptual paradigms lead to different recommendations for both a monitoring system and KPU governance is provided by Egon Guba and David Clark's (1974) essay, "The Configurational Perspective: A Challenge to the Systems View of Educational Knowledge Production and Utilization," in which they vigorously attack NIE's position in "Building Capacity for Renewal and Reform."* As we understand Guba and Clark's position, they would have the function of "monitoring" be accomplished more through informal communications between influential actors than through the formal reporting of

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*A critical discussion of this essay, based on our study findings, is presented in Appendix B. We agree with Guba and Clark's characterization of the nature of the KPU infrastructure in education and with their recognition of the necessity to use "configurations" as an organizing rubric for further inquiry but disagree with their use of the term "system" and their suggestion that the proper NIE response to a constituency that is a "non-system" is to delegate much of its decision-making responsibility to that constituency.

needs, problems, plans, and expenditures, and more by negotiated articulation of programs between local, state, and federal tiers of government than through any "external" approach that would address KPU as a whole.

These two contending orientations regarding how KPU in education should be conceived and monitored are representative of a still larger set of contending "paradigms" with which to understand and influence complex institutional behavior. Table 10, drawn from our Interim Report (Markley, 1974) classifies a variety of organizational conceptions found in the literature into three broad categories that form a multidimensional scalar. At one extreme of this dimension we find that it is unfeasible (whether or not it is desirable) to develop a "system" of integrated, coherent, and forward-looking metapolicy, policy, strategy, and tactics. If such a view were taken by NIE in its attempts to be "more vigorous in providing leadership for the direction and refinement of the nation's education research and development activities," and to develop a program for "monitoring and improving the Educational R&D system" (NCER Resolution No. 091875-19), the development of a monitoring program could take place without much regard for the overall leadership/governance posture of the Institute.

At the other extreme is the view that the various levels of policy-making should be well integrated and coherent. Holders of such a view would likely assert that policy development should be based on research, planning, monitoring, and evaluation that is as rigorous, systematic, and well articulated as possible.

A related conceptual definition yet to be made, which has enormous implications for the design of a monitoring system, concerns knowledge itself--the "K" in KPU. For purposes of conducting this study, we assumed that the knowledge in KPU was <u>new</u> knowledge (new to public education or to someone in the EKPU system); while it is clear the NIE's jurisdiction covers all of KPU in education, we tried to restrict our focus to what

Table 10

THE MULTIDIMENSIONAL SCALAR ALONG WHICH CONCEPTUAL ORIENTATIONS OF EDUCATIONAL KPU POLICY ARE REPRESENTED

(Restrictive Versus Permissive, Rational/Scientific Versus Advocacy/Political, Hierarchical Versus Participatory, Centralized Versus Decentralized; with Orientations that are "Mixed" or that Transcend the Dichotomy Shown in the Center of the Scalar)

Authors Proposing an Idealized Typology	Location of Conceptual Orientations on the Scalar		
	Comprehensive-Analytic Paradigm	Organizational Process Paradigm	Political Incrementalist Paradigm
Lindblom (1950)	Rational-comprehensive method		Successive limited comparisons method
Allison (1971)	Classical model	Organizational process model	Governmental politics model
Havelock (1971)	Research/development/ diffusion perspective	Social interaction perspective	Problem-solving perspective
Maruyama (1974)	Unidirectional-causal paradigm	Mutual-causal paradigm	Random process paradigm
Schmidtlein (1974)	Comprehensive/ prescriptive paradigm		Incremental/remedial paradigm
Guba and Clark (1974)	Systems view	Pattern view	
Cohen, March, and Olson (1972)		Garbage can model	
Sieber (1974)	Rational man	Cooperator	Powerless functionary

we referred to in shorthand as "EKPU(G)," that is, the production and use of new knowledge about the education process and/or its governance. We made no assumption about but were bothered by the lack of clarity regarding whether KPU should refer only to the creation and use of new processes and products for and in education by the institutionalized part of the KPU infrastructure, or whether it should include new knowledge that is produced and used without ever having been "blessed by the R&D establishment."

In our preliminary survey of various agents in KPU we encountered teachers and administrators who stated that as much as 50% of the new ideas and techniques they try and use were invented by practitioners and passed on through informal face-to-face channels. Additionally, in Case Topic V we found that one of the most significant obstacles to effective marketing of Minicourses for teacher inservice instruction was the lack of an identifiable agent at the local level with authority or responsibility to seek or try or purchase new innovations such as the Minicourses. Thus, on the one hand, both the criterion of realism and the congressional mandate to do a better job in addressing local needs argues for defining KPU in the broadest of terms, thereby continuing the process of conceptual expansion that led in the first place from "R&D" to "KPU." On the other hand, it would appear that there is almost no way that a monitoring system based on the social indicator conception could work within this definition.

A Matrix of Concerns

In keeping with NIE's initial request that this project emphasize the investigation of discrete types of "regulators" in KPU, we were asked to conclude this exploratory study by making recommendations regarding:

- Kinds of information on regulators which should be collected on a periodic basis as part of the program for monitoring KPU.
- Implications for the design of the quantitative data base for monitoring, including identification of key quantitative

indicators which should be monitored to determine the effects of important regulators.

- Special research studies which are needed to understand the operation and effects of specific policies or groups of policies in general and on specific sectors.

These three recommendations, together with NIE's three general objectives for the monitoring program noted earlier, make a convenient matrix for use in ordering a discussion of recommendations. Table 11 is so structured and provides a reference key to the ensuing discussion and summarizes the recommendations that are made in each "cell" of the matrix.

We do not believe that NIE's monitoring program is likely to have the necessary resources to make all recommendations operational. Hence, these recommendations are offered more as illustrations of the kinds of insights that stem from our study than as firm agenda to be pursued.*

In our closing section we highlight the recommendations that we judge to be feasible and reasonable next steps warranting serious consideration and support. These are organized by time sequence rather than by substantive topic.

Recommendations for Understanding the KPU System as a Whole (1)

Indicators (1-A)

We earlier reported our finding that it is unfeasible to develop a set of general systems "maps" of KPU in education unless one specifies in some detail what it is that one wants to understand about KPU. This, coupled with our conclusion that even if one does specify a purpose in some detail, many parts of KPU cannot be well summarized by social indicator statistics, leads us to recommend that, in general, questions stated

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*More recommendations are offered in most of the ten case studies described in Volume II of this report.

Table 11

THE MATRIX OF RECOMMENDATIONS FOR NIE'S MONITORING PROGRAM

	A. The kinds of information on regulators which should be collected on a periodic basis	B. Implications of the findings of our study for the design of a quantitative data base for monitoring KPU	C. Special research studies which are needed to understand the operation and effects of specific policies or groups of policies in general and on specific sectors
1. To achieve an understanding of the process of knowledge production and utilization in education			
2. To provide the data base needed for policy analysis a. To provide an early warning system to identify problems requiring policy initiatives.			
b. To assist in weighting policy alternatives by supplying data on the context of decision-making and the predictable impact of policy alternatives.			
c. To provide feedback on the consequences of policy initiatives.			
3. To provide for public accountability			

very broadly (e.g., What kinds of information on regulators should be collected on a periodic basis as part of the program for monitoring KPU in order to pursue the objective of achieving an understanding of the process of KPU in education?) not be pursued as a way to derive specific requirements of the monitoring program.

Design Implications (1-B)

Although some proponents of one or another paradigm that specifies how KPU should be conceptualized, monitored, and/or governed would insist that there is one "right" answer, we find (as has so often been found in the history of science) that it is neither necessary nor otherwise desirable to choose between contending conceptual viewpoints in any thoroughgoing manner. Rather, we believe that the question regarding KPU paradigms for monitoring and governance both will and should end up being framed not in terms of which conceptualization is "right" in some general sense, but in terms of which is most appropriate for a given purpose.

For instance, the use of our analytic framework in its various developmental "generations" (described earlier in this report) on the ten case topics we explored led us to the conclusion that although the "social indicator external monitoring system" paradigm is not very useful if one wants to understand cause-and-effect relationships or the dynamics of change in KPU (phenomena that are more influenced by informal than by formal factors), it is quite appropriate for displaying much of the needed information about program budgeting and fiscal control of KPU in education. This is a part of the KPU infrastructure that is quite strongly influenced--and even controlled--by formal policies; hence, by virture of its grounding in the formal legal system, it is a formal system, even though the development of formal policies is seemingly a most disordered process from a mechanistic/rational systems perspective.

We recommend, therefore, that the monitoring program not be based on any single paradigm, but should be "paradigm plural;" it should be resilient, and able to work with any emerging paradigm that might come to command the allegiance of most workers in KPU. The political astuteness of such a path is attested to by Ward Mason's observation that "a wide diversity of approach is inevitably to be found in a field like education which lacks accepted 'paradigms' or models of what is important to study and how to do it" (National Institute of Education, 1975, p. 31).

Operationally, this means that the sense of all of our recommendations is in keeping with the title of Donald Michael's recent (1973) book, On Learning to Plan--and Planning to Learn rather than with any "laundry list" of desirables that might be used for development of a monitoring program. In part, because of these facts, we finally were forced in our attempts to devise a feasible analytic framework for NIE's monitoring system, to create a system mapping analogue of the scientific method itself, together with the beginnings of a series of conceptual elements with which to use the method.

Special Research Studies (1-C)

Because of the difficulty we experienced finding taxonomic categories for use in a general analytical framework for KPU in education, and because we found that it is not feasible to classify or map given agents, policies, resources, or activities in highly aggregated fashion as a way to "understand" KPU, one of the essential conclusions we came to as a result of our study is that Guba and Clark (1974) may well be right in their contention that the notion of configuration is a proper organizing rubric through which to seek understanding of KPU in education.

> The term "configurational" was chosen to describe the view adjectivally because it (1) connotes a conformation of elements that exist in a definable territory; (2) assumes that the elements are (a) specifiable, and (b) relevant to one another; and (3) implies that the interaction of the parts is more than

> the sum of the parts, as, for example, configurationism in Gestalt psychology. The term also implies that there is no direct analog available which can simply be chosen and used as a model for this particular configuration of organizations as they relate to one another in terms of knowledge production and utilization.
>
> Guba and Clark (1974), p. 30 ff (emphasis added)

We recommend that NIE support a study that would investigate the utility of this conception as an organizing principle for the monitoring program. To do so would be a direct extension of the work begun in our study, which developed a workable (and we believe satisfactory) taxonomy for classifying formal policies in KPU. The new study could serve as a first-approximation feasibility of Guba and Clark's contentions vis-à-vis monitoring and governance of KPU, in part by developing a satisfactory taxonomy of configuration types.

A second special study that the Institute might sponsor is an investigation of multiorganizational coordination in KPU. We are frankly in doubt, at this point, about the kind of in-depth study that would be most worthwhile but agree with Sieber (National Institute of Education, 1975) that coordination and continuity of programs and policies comprise two very significant systemic problems afflicting the KPU "system" in education. A literature review might be a good starting point, however. In 1972, when writing one of the original planning documents for NIE, we noted that:

> The literature relating to the state-of-the-art of multiorganizational coordination is very fragmented, has not become summarized and analyzed, and appears in large part to exist in the form of unpublished government memoranda or similar reports.
>
> Markley et al. (1972), p. III-35

To our knowledge, such a literature review has still not been done and would comprise an excellent special study from which to infer monitoring implications.

We could suggest a variety of other special studies but, given that NIE has since its original planning days been besieged with more good ideas than it has money to consider, we will not suggest more.

Recommendations for a Data Base for Policy Analysis (2)

NIE's objectives, and consequently our discussion of recommendations regarding the data base needed for policy analysis is divided into three broad areas of concern: (a) early warning; (b) context illumination and impact prediction; and (c) feedback.

Indicators for Early Warning (2a-A)

It is clear that the specification of particular types of information that should be collected to provide an early warning capability to identify problems requiring policy initiatives should not be done in the abstract but should depend to a large degree on the design of the monitoring program and the degree to which other "future-oriented" analysis activities (such as those recommended as special research studies below) are conducted.

Given the recent evidence that educational lobbying has entered the "big time" (Wall Street Journal, October 21, 1974) and NIE's own allocations have recently been strongly affected by lobbying efforts (as noted in Case Topic I), it would appear that formal lobbying activities and related political influence processes in education comprise one type of "regulator" which NIE might well immediately start to monitor. At least one periodical (The Congressional Quarterly's Weekly Report) already exists which reports on lobby activities on major educational issues facing the Congress, and we suggest that this and similar sources of information be monitored and made part of whatever type of early warning system NIE might ultimately devise and implement. Additionally, the whole field of KPU would be beneficially informed if subsequent editions of NIE's

Databook carried the names of all registered lobby groups that seek to influence legislation in education and/or KPU, the substantive agenda enunciated as having a special priority for each such organization, and the budget expended by each for its lobby activities.

Design Implications for Early Warning (2a-B)

We list below various "early warning" events identified by SRI about two years ago. We include the list here as an illustration of how this type of information can be used to provide early warning on emerging educational trend issues.* Because this type of information cannot readily be synthesized from quantitative data bases, it is necessary to design into the monitoring program one or more "pattern recognition" procedures if this type of information is desired.

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*For instance, the context of education at present (and in the foreseeable medium-range future) is one of fiscal tightening and declining enrollment, thereby bringing a general contraction of discretionary (e.g., KPU-related) programs and personnel at the LEA level. With an "aging" teacher population caused by current seniority policies, the flow of new knowledge to operational classrooms from teacher training institutions and expensive in-service programs is likely to be much less significant than in the past. (The importance of this observation is indicated by the finding that "comparatively small amounts are usually spent on upgrading teacher competencies when innovations are introduced.... There is a tendency, when innovations are introduced, to hire additional personnel already possessing new skills rather than to retrain the current staff and reassign them to new functions" (Hyer and McClure, 1973). Therefore, materials and processes that can be readily used by existing personnel and that either have a low initial cost or can be amortized in various ways appear to be most significant for current policy consideration. Conventional textbooks, transportable and reusable in-service packages, and utilization ventures entailing cooperative consortia of schools appear to meet these requirements. Hence, they are judged to be particularly significant activities to plan for and to monitor, other things being equal.

- Highly probable/almost certain
  - Declining enrollment, unused facilities and staff layoffs--unless structure/function of public education is reorganized and expanded.
  - Financial squeeze, nonpassage of bond issues and tax overrides, rising costs but declining income.
  - Increasing unionism--possibly extending through administrators and university professors, with public school collective bargaining virtually accomplished on a statewide basis.
  - Emphasis on software (programming, conceptual aspects) rather than hardware (equipment) in educational technology.
  - Broadened credit certification of students (GED high school equivalence test, credit for outside experience, etc.).
- Reasonably probable
  - Changing credentialing/certification of professionals (multidisciplinary community consortia for credentialing of noneducator experts requirement of renewal of credentials; question of credentialing for publicly supported "nontraditional" education).
  - Universal post-secondary educational opportunity (both collegiate and nontraditional modes of study; with the nontraditional modes increasing as the supply of college graduates exceeds the demand for their services).
  - Recurring education [on again/off again full and part-time study, K through D(eath)].
  - Emphasis on "out of school" experiences as an essential part of education; the school being a broker, expediter and overseer to facilitate this process.
  - Conflict regarding "stimulus control" (control by others) versus "respondent control" (control by self) in potent new socio- and psycho-technologies as used in public schools.
- Conceivable
  - Year around schooling to save money and make education more effective.

- Reversal of seniority aspect of tenure laws as applied to layoffs (due to lawsuits based on equal opportunity considerations)--quality/effectiveness being used instead.
- Educational voucher system, allowing students/parents to choose public or private schools or other way of accomplishing education.
- Reversion to "3-Rs" emphasis in many public schools.

Special Research Studies for Early Warning (2a-C)

We suspect that for some time to come NIE will not have the necessary resources to develop an adequate system to provide an early warning capability (objective 2a), to provide data on the context of decision-making in KPU, or to provide for feedback and public accountability in any widespread degree. We therefore recommend that NIE seriously consider developing policies that would combine both governance and monitoring of KPU in ways that would tend to fulfill all of these objectives. As an example of how governance and monitoring might be so combined, we note that a policy used by USOE in connection with their governance of the ESEA Title III Teacher Initiated Innovation Program discussed in our Case Topic VII appears to have valuable characteristics for NIE to consider. Essentially USOE imposed a requirement that each state wishing to participate in the program would have to prepare a state plan meeting certain procedural but few substantive requirements. This essentially allows a federal agency to monitor the felt needs and planned responses on a state-by-state basis without becoming overly involved in data collection. USOE also made full funding contingent on receipt of an acceptable plan with partial funding guaranteed even if the plan was not approved. By use of this policy, USOE obtained a strong "leverage" effect on weaker SEAs, through which it was successful in encouraging them to engage in a type of systematic KPU governance activity not previously engaged in.

If NIE does wish to pursue the types of studies that would lead directly toward these objectives, however, we suggest that our recommendations regarding "Research on the Societal Context of Education" made during the preliminary NIE planning phase be consulted (cf. Markley et al., 1972).

Indicators for Context Illumination and Impact Prediction (2b-A)

We find no basis for recommending any specific indicators for forecasting or estimating the predictable impact of policy initiatives unless particular policies and particular types of impacts are first specified. (For example, we recommend below an assessment of the impacts of the Buckley Amendment.)

A variety of indicators could be collected that would supply data on the context of decision-making in KPU. We recommend one that would help illuminate the degree to which balance and continuity--two systemic properties of critical importance to a healthy "ecology" in a complex living system--are displayed by fiscal allocation and procurement in KPU.

In our Case Topic II (dealing with NIE procurement policy) we noted that NIE has an expressed preference for the competitive-contract mode of procurement. In Case Topic IV (dealing with policies influencing research performers) we learned of various ways in which excessive reliance on this mode by NIE produces counterproductive results (e.g., causing secrecy and proprietary posturing where an attitude of collegial openness once prevailed regarding one's exciting new hypotheses and creative insights about KPU). Also in our preliminary survey to identify important "regulators" in KPU, universally the most commonly nominated influence was "money."

Because of these findings and because we note that NCER has recently passed a resolution asking NIE to take a fresh look at its procurement policy, we recommend that NIE monitor and publish in its Databook a cross-tabluation of its disbursements in various categories. As specific

categories to consider, we suggest the level of funding underlying its principal procurement modes (e.g., field-initiated grants), its principal substantive categories of support (e.g., dissemination, basic skills, equity), and the types of recipient (e.g., university, not for profit, state agency).

Design Implications for Context Illumination and Impact Prediction (2b-B)

Again we express our finding that attempts to map (and, by inference, to monitor) the KPU infrastructure in terms that are general yet sufficiently specific to permit the drawing of detailed inferences about KPU dynamics and structural influences is not feasible. Therefore we recommend that "identification of key quantitative indicators" be attempted only after NIE's policy analysis data needs have been identified. We expect that a convenient way to portray this relationship would be to construct a matrix in which one dimension of classification would represent the various purposes of analysis needing to be informed by information about the KPU infrastructure and the other representing the various configurations in KPU whose infrastructure and characteristics would need to be monitored in different ways due to their different nature.

Special Research Studies for Context Illumination and Impact Prediction (2b-C)

Although a variety of studies could be recommended here, we will only provide illustrations of four different studies that we find important. One would look at program and policy codification efforts performed by others which might be useful parts of NIE's monitoring program. The second would directly identify policy analysis data needs that should be considered when designing the monitoring program. The third would lead to an ability to estimate or forecast the predicted impact of policies on KPU,

and the fourth would involve an experiment with an innovative approach to program management at NIE.

1. Using Program and Policy Codification Efforts Performed Elsewhere

A logical next step beyond the monitoring and reporting in cross-tabulated form of NIE and other KPU procurement activities could well involve the cataloging of federal KPU program obligations. This could involve extracting from such existing catalogs of educational program obligations as USOE's Catalog of Federal Education Assistance Programs and cataloging KPU assistance programs supported by nonfederal agencies as well. Such an effort would require such an extensive clarification in the definition of "KPU" that it is not feasible at the present time, although a study of its feasibility might be undertaken.

An effort that might lead to activities that can be implemented immediately would involve studies to determine the utility of policy codification efforts currently being done either commercially or by other government agencies in education. Companies such as the Commerce Clearing House and Prentice-Hall Publishers maintain reporting services on various aspects of the law. Officials at the Commerce Clearing House have expressed an interest in the feasibility of extending its "CCH Reporter on Higher Education" efforts into other aspects of education.

We found in researching Topic IX that a significant number of LEAs are beginning to contract with service agencies for services such as the codification of their policies and the monitoring of policies emanating from higher levels of governance of which they must be aware. The Southern Carolina School Boards Association, for example, has been active in policy codification for various LEAs in the Southeastern states. This group is able to do an initial codification task in a typical LEA for between $2500 and $5000, with the cost of updating running about $400 per

year. In California, a publication entitled the California School Law Digest keeps the LEAs abreast of the judicial decisions affecting the operation of California schools. This digest is published monthly and costs $30 per year.

We hypothesize that the general adoption of these services by the LEAs would greatly enhance NIE's policy-monitoring capability. Instead of attempting to build an extensive policy information bank--extremely expensive both in terms of initial development and updating--NIE policy analysts would need only to learn how to use the various codes and other services being produced at the local and state levels. For this reason, we suggest that NIE investigate the various services available. By informing and encouraging the LEAs relative to the availability of the various legislative information services, NIE might increase further the rate at which local education policies are becoming codified and hence available in a realistic sense for policy analysis.

We note that the NIE research library (part of NIE's Educational Resources Division) is considered the principal federal library in the field of education and is already collecting and cataloging various types of information on educational research and governance. With a small increase in its reference staff, this facility might be appropriately used as an adjunct to the monitoring program staff, dealing primarily with highly codified policy and program information archives needed for a policy monitoring capability.

2. Identify KPU Policy Analysis Data Needs

To repeat, it is generally not feasible either to "map" the regulatory system structure of KPU in education or to "monitor" its system dynamics unless sufficiently specific purposes of mapping/monitoring are first made explicit in order to infer what parts of the system structure and dynamics should be highlighted. We therefore recommend that an early

task in the development of the monitoring program be a systematic identification of major policy analysis data needs that are likely to be felt by NIE and other significant policy setting bodies in KPU (principally SEAs and congressional staff) over the next two to four years. We mention the policy analysis needs of SEAs for two reasons: (1) the primacy of state governance in educational matters is the preferred policy of the United States as expressed by both the Constitution and by congressional legislation such as 20 USC 123a (Prohibition Against Federal Control of Education); (2) with the recent philosophy of revenue sharing and other trends, it appears that the state tier of government may be on the ascent in influence relative to other levels of governance in the United States. After receiving federal support via ESEA Title V for almost a decade, many state agencies are now attempting to build effective bureaus of research, planning, and evaluation--bureaus that are perhaps uniquely qualified to collaborate with NIE in building an effective R&D support system in education.

Given the important policy analysis data needs of Congress, as well as the importance of NIE's relationship to Congress, the data needs of congressional policy analysis agenda might be considered as well.

3. Assess Probable Impacts of the Buckley Amendment

An example of a policy analysis data need that we believe should have a high priority for NIE and that well represents the type of policy analysis requiring quantitative information about the KPU infrastructure is the recently enacted Buckley Amendment (PL 93-380, Section 438) was explored in Case Topic III. This amendment seeks to protect the privacy of students by requiring, among other things, that researchers wishing to gain access to student records obtain permission of the parents of the students involved, and that they place in the student file a statement that the file was so used and for what purpose. Educational officials who use such information for improvement of public school programs

and researchers were are "representatives of educational officials" conducting evaluations of federally sponsored educational programs are specifically exempted from the parental permission requirement.

A formal analysis of the probable impacts of the Buckley Amendment would provide NIE officials and other KPU professionals with needed information with which to provide leadership in influencing Congress to change this legislation, should this appear to be worthwhile. As discussed in Case Topic III, such an analysis would require information about the KPU infrastructure that is not currently available in NIE's Databook. How to obtain this information represents an excellent case example of the trade-offs to be faced in deciding what types of information the monitoring program should provide. We recommend that NIE sponsor both a policy impact assessment of the Buckley Amendment and, as part of this assessment, an appropriate survey of the KPU infrastructure to identify all types of agents and activities likely to be impacted.

4. An Experiment with Innovative Program Management

We wish to go considerably beyond the assigned scope of the recommendations we were asked to make in this study and to suggest that NIE consider experimenting with an organizational innovation through which program management at NIE (and other federal agencies as well) might be significantly improved.

Although we do not describe the rationale underlying KPU design nor some of the long-term advantages and disadvantages it might offer, we note that the complexity of the KPU system is such that a sufficient level of understanding for adequate program management usually lies beyond the capability of any single administrator or any staff. We believe that no combination of monitoring and analysis that could feasibly be conducted will significantly change this situation given the usual ways in which

functional responsibilities are divided in administrative agencies of the government.

We therefore recommend that NIE consider conducting one or more intramural experiments in which a project management team would replace the usual program officer-contracts officer team. In such a team approach the following types of personnel would be valuable--both to assist in project management and to fulfill many of the functions that now look unfeasible for a nonhuman "monitoring system" to fulfill:

- One or several substantive specialists who should know the current state of the art from the academic/technical perspective. One or more might be nationally known experts who would serve the team in a consulting capacity, thereby assuring technical adequacy.
- A program historian who should know the past programs that have been mounted by various agencies in the topic area (and what became of them). This would assure a higher degree of coordination of programs supported by NIE with other past and present efforts.
- A policy specialist who should know the significant policies and organizational structures that exist at the federal, state, and (to the extent possible) local level. This would assure that NIE programs are designed so that they would be more apt to interface properly with organizational requirements in the field and comply with significant policies throughout.
- A combination social scientist/investigative reporter who should get to know "what's happening" and "how things actually work" in the field from an impressionistic/anecdotal perspective. This person would spend at least half time in the field talking to different KPU personnel. This would assure that NIE programs interface properly with the informal as well as the formal customs, policies, and constraints that actually influence KPU most strongly.
- A contracts specialist who would act much as this type of agent does at the present time, but who would additionally take a leadership role in seeking change in administrative requirements that make effective procurement difficult.

These specialists would work together with NIE management to design, manage, and evaluate/redesign NIE programs, and in so doing, might be able to alleviate shortcomings in the process that are usually not even generally detectable without some such approach. For instance, rapidly changing federal funding and program management policy in educational research over the past decade and the lack of postprogram audit and follow-up ("next stage") programming often have contributed to the inefficient and disheartening practice of supporting good programs which, when completed, simply "disappear"--not because the programs themselves were deficient, but because of a lack of mechanisms to ensure continuity coordination and integration in KPU.

Given that NIE is permitted to spend only 10% of its funds intramurally, one might argue that its intramural research should be oriented toward intramural topics. Whether or not such an argument has merit, we view the above experiment as one that has exceptional significance, not only for NIE but for federal research program management generally. It should be noted, however, that the information necessary for the program historian and the policy specialist to work effectively has not been collected. Therefore, an initial effort on such an experiment might be to draw these types of information together. (The persons involved in the initial fact finding regarding program history and existing policies could, of course, become the specialists in the proposed experimental team, thereby using the conduct of the initial studies as a way to tool up for the new role.)

Indicators for Feedback [2c(and 3)-A]*

We recommend that no attempt be made to identify periodic data collection efforts until those policy analysis data needs having highest priority have been identified.

Design Implications for Feedback [2c(and 3)-B]

The design of a monitoring system having a capability "to provide feedback on the consequences of policy initiatives both those designed to improve the Nation's capability for conducting educational R&D and those designed to change the schools directly" is, we believe, clearly beyond the state of the art and will remain so for some years to come if this capability is interpreted at all literally or rigorously. There are a number of different ways to pursue this goal, however.

Assuming that the study identifying and describing the important configurations in KPU has been done, it should be possible to do a periodic survey of problems, needs, and changes in KPU that are perceived by representative actors in each of the major configurations. By collating and comparing the responses as a function of configuration represented (possibly using discriminant analysis or some related statistical technique), it might be possible to notice changing patterns in reported problems that would to some extent follow program initiatives undertaken by various agencies in KPU.

Alternatively, depending on the positions that NIE ends up taking on the four issues noted at the beginning of this chapter, it might be

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* Because of the substantive similarity between "feedback" and "accountability," as these two terms were used in NIE's objectives, we combine them for convenience in this discussion.

possible to develop feedback mechanisms that would depend on the planning and assessment activities of agents in various configurations throughout KPU.

Still a third possibility would be to promote the existence of and to depend strongly on the perceptions of personnel whose professional responsibilities are primarily concerned with knowing what actually goes on in various parts of the KPU infrastructure, such as the "education extension agents" studied in Case Topic IX, or the "social scientist/ investigative reporter" envisioned in the intramural experiment (2b-C) above.

Special Research Studies for Feedback [2c(and 3)-C]

For reasons discussed above, we recommend that NIE place other monitoring objectives above this one. Once its higher order priority concerns are being fulfilled, however, one or more studies might well be conducted that would investigate the feasibility of implementing such feedback monitoring mechanisms as were discussed in 2c(and 3)-B above.

Recommendations for Sequential Action

As was stated earlier, we would not seriously recommend that NIE pursue all of the possibilities expressed in the preceding section. In order to highlight those recommendations we believe are most appropriate for NIE's serious consideration and place them in a temporal perspective needed for realistic policy development, we discuss a few of these recommendations in the sequence in which they could feasibly be pursued. The recommendations so selected represent either issues needing to be resolved before subsequent design steps can take place coherently, or monitoring actions that are currently needed and can take place independently of the

overall strategy NIE ultimately selects on which to base its monitoring program. Such recommendations would lead to an improved understanding of what is feasible to monitor in general.

Identify KPU Policy Analysis Data Needs

At various points in our discussion we have sought to convey our finding that the design of a monitoring program should be based to a large extent on the actual data needs of the policy analysis activities it is to support. This is not to say, however, that the monitoring program should include only those data collection activities that have immediate and direct use. Rather, a whole level of detail more specific than that set forth thus far regarding objectives and purposes for the monitoring program needs to be specified by NIE before proceeding much further, and the identification of KPU policy analysis data needs (both within NIE and elsewhere) should be one of the essential parts of this process.

We do not envision this as a massive undertaking, but rather a relatively direct process of asking various individuals and groups known to do or planning to do important types of policy analysis regarding KPU in education what analyses they envision doing over the next two to four years, and to infer the types of information about the KPU infrastructure (see Table 12) they would need to do more valid, informed, or defensible analyses. The individuals and groups might be sampled from within NIE only, or from Congress, other federal educational agencies, state educational agencies, and possibly from the professional community as well. We suspect that the sampling plan would depend to a large extent on the types of choices that NIE makes regarding the following issues that we discussed earlier:

1. The degree to which NIE's monitoring program will be based on any given conceptualization or paradigm as opposed to being based on a deliberate or haphazard mixture of conceptual approaches.

Table 12

THE FOUR SAMPLE PURPOSES OF ANALYSIS

1. Identify how a particular policy contributes to the completion of some higher level goal through investigations of:

   (a) Activity coordination: identify the policies and activities that serve to coordinate the target activity with other activities in service of larger KPU goals.

   (b) Resource accessibility: identify the adequacy of resources to carry out a particular policy.

   (c) Policy coordination: identify how a specific policy coordinates a set of policies to specify a given activity or to regulate some agent or resource.

   (d) Agent/activity impact assessment: list responsibilities and concerns carried by a set of agents or activities and estimate the impact of the target policy on the life of one or more of these agents or activities.

2. Identify the elements of the policy through the investigation of:

   (a) Agent/activity identification: list all agents or activities having enforcement or compliance responsibility under a given policy.

   (b) Activity analysis: break the activity specified by the policy into its constituent stages and elements (policies, agents, and resources), and show how the elements interact as the activity is performed.

   (c) Policy/activity design: on the basis of existing knowledge, assess each stage of a proposed policy or activity in terms of requirements for proper functioning.

   (d) Policy identification: list all significant policies

      (1) A given agent or activity is responsible to enforce.

      (2) A given agent or activity is responsible to comply with.

3. To identify the impacts of policy through:

   (a) Impact identification: map all the activities, agents, resources, or policies that are (or might be) significantly impacted by a given policy.

   (b) Agent/activity impact assessment: analyze the effects on a given agent or activity of the entire spectrum of policies acting on it.

   (c) Policy dynamics: identify other policies that aided or impinged on the developmental process.

4. Describe policy simply and clearly through:

   (a) Identification of the policy(s), generated at the level of the aggregate agent, and specification of the stages of the activity.

   (b) Identification of the various stages of the activity in order of occurrence, the particular agent responsible, and the requisite resources.

   (c) Identification of other policies that affect these in their operation. If indicated, describe conflicting policy(s).

2. The degree to which NIE will try to rigorously articulate (i.e., codesign and coordinate) its monitoring program and its other governance functions.

3. The degree to which new knowledge will be conceptually limited to include only that which results from processes and/or products of the institutionalized KPU system.

4. The degree to which data needs and data collecting activities of other agencies (particularly at the state level) will be explicitly considered in the design of the monitoring program.

Address Underlying Issues

Unless NIE should decide to choose the "least effort" alternative in each of the above four issues (i.e., haphazard mixture, no articulation, NIE data needs only, institutionalized KPU only), we strongly recommend that NIE, in addition to holding a conference on alternative conceptualizations, find some way of addressing and making tentative decisions regarding issues such as (but not limited to) the above four. Given the council's resolution on seeking input from outside the Institute, one possibility would be to hold, in addition to the conference on alternative conceptualizations, a workshop in which invited participants would join NIE staff in addressing these issues which have profound long-range implications regarding how KPU is to be conceptualized, understood, and governed.

Monitor KPU Obligations and Procurement Activities

We suggested above that the monitoring of KPU obligations and procurement levels in various categories would make an ideal addition to the Databook. By preparing cross-tabulated levels of support for KPU activities across time in such categories as procurement mode, substantive topic addressed, and type of recipient, several important system indicators could be developed. One indicator could deal with the balance of support

and one with continuity of support--both for particular configurations and for the KPU system overall.

As an alternative to the "social indicator" approach we also recommend that NIE explore various ways of using the program plans and reports of SEAs, one of which we described above in 2a-B.

Assess the Probable Impact of the Buckley Amendment

As stated earlier, assessing the likely impacts of the Buckley Amendment (PL 93-380, Section 438) is a task that (a) currently needs to be done; (b) represents a type of analysis believed to be increasingly necessary in the future; and (c) requires information about the KPU infrastructure that is not currently available in the Databook. Essentially, as we showed in Case Topic III, such a policy impact assessment, if at all rigorously done, would require at a minimum a listing of all actual research activities in KPU that would have been subject to the amendment as a way of estimating how many and what types of activities are likely to be impacted in the future. A more ambitious assessment would require the use of some method such as we developed in this study to trace out significant cause-and-effect relationships through the system. Because of the way in which the law is written, this listing must involve considerations of, for example, the purpose for which the research was done, under whose auspices the research was done, and whether evaluation of federal educational programs was involved.

Although we essentially concluded that the data needed to assess the impact of the Buckley Amendment would be best obtained by doing a special survey--as opposed to assuming that the monitoring program would or should ever attempt to make information about the infrastructure available at such a fine level of detail--this task is perhaps a good example of a policy analysis data need to use in exploring various trade-offs to be faced in deciding what types of information the monitoring program should

or should not attempt to provide. Additionally, it offers NIE personnel a concrete instance for use in developing internal policy through which to articulate monitoring functions, policy analysis functions, and governance functions. Assuming, for example, that NIE decided to conduct one or more special surveys as Phase One of a policy impact assessment, the question arises whether the supervision of such surveys should be vested in the Monitoring Program Office or within a substantive office of the Institute.

Identify and Describe Configurations in KPU

We noted previously that a study to investigate the utility of the notion of configuration as an organizing rubric for understanding KPU would continue the efforts we began in this study to develop an analytical framework for understanding KPU and would represent the next logical step in its development.

Guba and Clark suggested six categories as an appropriate starting place for such an effort (see Table 13), and then went on to suggest several questions and ways of answering those questions that should be employed (Guba and Clark, 1974, pp. 31-32). A published enumeration of the membership in each category of this essentially agent-centered taxonomy would be a valuable contribution of a monitoring program. Even more valuable, however, would be one or more representations of how these agents tend to form into various configurations around common goals related to improvement-oriented change in education.

Consistent with what has been said above, however, we caution that, to ensure a categorization of configurations likely to be useful to the needs of policy analysis in KPU generally, this study should not be undertaken until the identification of KPU policy analysis data needs has been conducted. Thus, although the results of this task would greatly assist in the task of assessing the impact of such policies as the Buckley

Table 13

CLASSIFICATION SCHEMA FOR INSTITUTIONS AND INDIVIDUALS IN THE EDUCATIONAL KPU COMMUNITY

Categories	Common Examples	Characterization
Generic classes of agencies	- Local education agencies - Institutions of higher education - State education agencies - Regional educational laboratories - Private research organizations	Defined by a common, primary operational goal(s) which may or may not be KPU oriented, e.g., operating schools, monitoring educational agencies, effecting change in schools, developing instructional materials.
Clusters of homogeneous agencies	- Council of Chief State School Officers - American Association of Colleges for Teacher Education - Great Cities School Improvement Program	A subset of the generic class (sometimes the entire class) distinguished by a special concern, characteristic, or purpose, e.g., political influence, shared expertise and knowledge, size, type of operational problem confronted by the agency.
Clusters of heterogeneous agencies	- Council for Educational Development and Research - Teacher centers - School study councils	A cluster drawn from several generic classes and formed to pursue some common purpose or interest, e.g., political influence, operating efficiency or effectiveness, shared expertise.
Individual agencies	- New York State Department of Education - Chicago Public Schools - Center for Vocational Education - Georgia Southern College	Particular operating agencies with some assigned line responsibility in the American educational system. The overwhelming bulk of such agencies are responsible primarily for the task of educating children and youth.
Individuals within agencies	- University professor - Public school teacher - SEA staff member - Evaluator in an REL	Particular actors, who may or may not be primarily committed to KPU activity (generally not), who are assigned individual roles in any of the individual agencies.
Clusters of individuals within or across agencies	- National Education Association - American Educational Research Association - American Association of School Administrators	Clusters of actors who join together in member-associations locally, i.e., parallel to individual agencies, or on a state, regional, or national basis to pursue common interests, e.g., political, substantive, or disciplinary, welfare.

Source: Guba and Clark (1974), p. 35

Amendment (e.g., to trace out the impact on KPU of not having certain types of longitudinal data available within reasonable cost), it should not be made prerequisite to the policy impact assessment study recommended above.

(We note that an enumeration of the principal agents, resources, and activities that comprise the entire KPU infrastructure in education is a sorely-missed feature of the current Databook. The cost of a survey to make this type of data available, however, together with our conclusions regarding the necessity to generate conceptual categories around existing policy analysis data requirements, suggest that unless NIE wishes to undertake two such surveys, a survey of agents, resources, and activities in KPU be delayed until the principal configurations have been identified and described.)

Conclusion

In this project we explored some of the design requirements necessary to create a practicable program for monitoring the KPU infrastructure. Due to the scope of our study, we did not consider the design requirements for the KPU system itself although this clearly needs to be considered as well. As Sam D. Sieber recently observed:

> A national R&D system, we are told, is something that NIE is mandated by Congress to nourish and bring to fruition...something which nearly all of us endorse--and yet, no one seems inclined to define this system. Clearly it is not something that exists in the natural order of things, but something that we would like to approximate more closely than at present. These considerations have led me to ask: What might be the design requirements of an R&D system in education?.... Note that I am addressing myself to systemic requirements and not to the ultimate intended outcomes of the system, such as equity, preparation for work, enlightened citizenship, etc. To a large extent system requirements can be spelled out independently of the desired outcomes.... If present funding restrictions continue, however, so that these systemic needs

> cannot be met, then I would urge that we disabuse ourselves of the conceit that we are creating a "national educational R&D system."
>
> National Institute of Education (1975), p. 85

Both because of the problems and issues discussed in this report and because of observations such as it quoted above, we conclude that it is not feasible to implement a program for monitoring the KPU infrastructure in education that would be based on a thoroughgoing "social indicators/system dynamics" conceptual orientation (or any other type of unitary orientation). Instead, the conceptual underpinnings as well as the concrete specifics of the monitoring program must be developed on a step by step basis through which the Institute and other KPU agents "learn to monitor and monitor to learn."

V A BIBLIOGRAPHY FOR THE INVESTIGATION OF KNOWLEDGE PRODUCTION AND UTILIZATION IN EDUCATION

This bibliography lists those references we found most useful in our exploration of the normative structure of knowledge production and utilization. We present it as a working tool to be used along with the analytic framework to assist in NIE's design and implementation of a monitoring program. In decisions concerning the selection of entries, we emphasized quality rather than quantity.

The bibliography is divided into six sections:

- Educational Governance.
- Systems Literature.
- Other Methods for Studying KPU.
- Policy Information Sources.
- Guides to the Use of Policy Information Sources.
- Legal Resources and Policy Archives: A Quick Reference Guide for Policy Analysts.

In the first five sections we have annotated those references we found most useful and have included simple bibliographic listings of other relevant readings. The final section provides a quick reference guide developed through the work on this project to legal resources and policy archives.

Educational Governance

This section covers materials on the structure and operation of agencies that make up the education system, on the decision-making or affected agents, and on the political and governmental environments in which they operate.

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Fuller, E., and J. B. Pearson, eds., Education in the States: Nationwide Development Since 1900 (National Education Association of the United States, Washington, D.C., 1969).

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Jacob, H., and K. Vines, Politics in the American States: A Comparative Analysis, 2nd ed. (Little, Brown & Co., Boston, Massachusetts, 1974).

Kirp, D. L., and M. G. Yudof, Educational Policy and the Law, Cases and Materials (McCutchan Publishing Corp., Berkeley, California, 1974).

Kirst, M., ed., The Politics of Education at the Local, State, and Federal Level (McCutchan Publishing Corp., Berkeley, California, 1970). This book is a collection of articles by educational researchers. It addresses the questions of who has influence in school policymaking and who is subject to it, how this influence works in the education context, what the terms are upon which influence is expended, how action is concerted by influence, and who aggregates enough "pieces of influence" so that the total is sufficient to adopt the proposal. An article of particular interest is "State Politics of Education" by Laurence Iannaccone. This article conceptualizes systemic causes of a lack of "good feelings" between agents in the academic and research communities and agents functioning within the bureaucracy.

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Merrow, J., "The Politics of Federal Educational Policy: The Case of Educational Renewal," Teachers College Record, Vol. 76, No. 1, pp. 19-38 (September 1974). Merrow presents an excellent review of USOE-congressional struggles over "educational renewal" programs, a good example of the lack of cohesion and coordination in the political decision-making environment relevant to federal educational policymaking. This paper provides important insights into the political history of teacher centers.

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Boulding, K., "General Systems Theory--The Skeleton of Science," Management Science, Vol. 2, pp. 197-208 (1956). Boulding's article, one of the classic discussions of hierarchies in general systems, is useful for conceptualizing levels of importance, issues of complexity, and the limits of current systems methodologies.

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publishers with the actual functions these agents found necessary. The finding that these agents were not to be neatly fitted into the simple categories of merely researching, developing and evaluating or distributing led Brickell and Wong to conclude that the RDDA division is not a useful dimension along which to divide the three KPU agents investigated, since each performs all of these functions in one way or another.

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Guba, E. G., and D. L. Clark, The Configurational Perspective: A Challenge to the Systems View of Educational Knowledge Production and Utilization (School of Education, University of Indiana, Bloomington, Indiana, 1974). Guba and Clark discuss the origins and effects of "systems" thinking on KPU policy and argue for the desirability of abandoning the "systems view." They suggest that the KPU system is composed of configurations of actors and must be investigated as such, not as the composite of members of a priori categories.

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Miller, J. G., "Living Systems: Basic Concepts," Behavioral Science, Vol. 10, No. 3, pp. 193-237 (July 1965); and "Living Systems: Structure and Process," Behavioral Science, Vol. 10, No. 4, pp. 337-411 (October 1965). The Miller papers present a comprehensive discussion of that part of General Systems Theory dealing with "living systems," of which EKPU as a social system is a part. The author uses clear and nonmathematical definitions of basic systems concepts and rules, and takes an organismic perspective when describing systems. The discussion of structure and process in "living systems," as a part of General Systems Theory, is followed by 165 "cross-level hypotheses" that organize multidisciplinary research findings into systems concepts. These articles provide useful background for researchers and policymakers, with numerous implications for the further study of process and regulation in EKPU as well as other areas.

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U.S. Office of Education, National Center for Educational Research and Development Taxonomy (Washington, D.C., 1969).

Van Gigch, J. P., Applied General Systems Theory (Harper & Row Publishers, New York, New York, 1974). This book is of interest primarily as an introductory text requiring of the reader little or no expertise in higher mathematics.

Von Foerster, H., et al., Cybernetics of Cybernetics, Biological Computer Laboratory (University of Illinois, Urbana, Illinois, 1974).

Other Methods for Studying KPU

This section provides readings on approaches to the inquiry into KPU that differ from the particular analytic approach around which our project was initially oriented. These include studies using R&D, RDDA, and problem-centered models of educational research and development.

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government makes revenue-sharing an important part of its policies of education (Annotation is quoted from the catalog of Lexington Books).

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Vickers, Sir Geoffrey, Science and the Regulation of Society, Occasional Papers (The Institute for the Study of Science in Human Affairs, Columbia University, New York, New York, 1970).

Wirt, F. M., et al., Introductory Problems in Political Research (Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1970).

Wirt, J., A. Lieberman, and R. Levien, "National Institute of Education: Methods for Managing Practice-Oriented Research and Development," The Rand Corporation, Santa Monica, California (1971). This report was generated to provide HEW with information on alternative management strategies that might be used in the support of educational R&D by the then-proposed National Institute of Education. The authors describe the application of eight paradigms of management as used in three federal agencies for the management of their practice-oriented research and development.

Policy Information Sources

This section provides references to sources of information found useful in our applications of the analytic framework. It includes the following four general categories: 1. archives of formal policy that are available; 2. various interpretations of policy, such as statistics and formal opinions; 3. specialized policy reporting news services; and 4. directories and abstracting services that cover information relevant to KPU.

1972 Census of Governments, Public Employment: Employment of Major Local Governments, Bureau of the Census, Vol. 3, No. 1 (Government Printing Office, Washington, D.C.).

1972 Census of Governments, Government Finances: Finances of School Districts, Bureau of the Census, Vol. 4, No. 1 (Government Printing Office, Washington, D.C.).

Code of Federal Regulations (Government Printing Office, Washington, D.C.). The Code of Federal Regulations (C.F.R.) is the codification of the regulations emanating from the federal administrative agencies as based on their statutory authority. It is divided into 50 titles and is updated annually.

Congressional Information Service, CIS/INDEX (Government Printing Office, Washington, D.C., 1970). This service provides references and abstracts to every important document printed by the federal government. It is updated monthly and may be accessed both manually and by computer.

Congressional Quarterly Service (Congressional Quarterly, Inc., Washington, D.C., 1945-). The Congressional Quarterly publications are a good source for an overview of congressional activity and the primary chronicle of information on lobby activity at the federal level. This service provides three publications: The Weekly Report, the Quarterly Index, and the Almanac. The Weekly Report is a magazine that focuses on congressional and political activity. It reports the full content of presidential press conferences, major statements,

messages, and speeches. The "Congressional Box Score," a useful table published in each issue, gives a running report of the status of the major proposed legislation in Congress. The Quarterly Index and the Almanac are both drawn from the information in the Weekly Report. As the title implies, the Quarterly Index is simply an indexing of the Weekly Report. The Almanac is a reorganization and summation of year's issues and activities in the previous Congress as reported in the Weekly Report. This publication is organized by topics and provides an excellent capsulization of the activities and interests of the U.S. Congresses.

Corpus Juris Secundum (C.J.S.) (West Publishing Co., St. Paul, Minnesota). American Jurisprudence (Am. Jur.) (Lawyers Cooperative Publishing Co., Rochester, New York). C.J.S. and Am. Jur. are the two encyclopedic references to American law. C.J.S. is a complete restatement of the law, which cites in footnotes all cases that support a particular point of law from 1658 to date. Am. Jur. offers a comprehensive restatement of the law; however, it cites only selective decisions in its footnotes. Both encyclopedias may be found in the normal law library.

Current Index to Journals in Education, National Institute of Education (The Macmillan Co., New York, New York, 1969-).

Current Index to Research in Education, National Institute of Education (Government Printing Office, Washington, D.C., 1966-). The Current Index to Research in Education (R.I.E.) and the Current Index to Journals in Education (C.I.J.E.) are the components of the ERIC System, an abstracting service for publications concerning the field of education. The R.I.E. covers speeches, papers, and reports not published in the journals. C.I.J.E. covers the entries related to education in over 700 periodicals. These files are updated monthly and may be searched both manually and by computer.

ERIC Clearing House on Information Resources, "A Guide to Educational Resources, 1975-76," Stanford Center for Research and Development in Teaching, School of Education, Stanford University, Stanford, California (Fall 1975). This 33-page guide is a concise, up-to-date directory of selected sources of education information.

Harris, S. P., State Departments of Education, State Boards of Education, and Chief State School Officers (Office of Education, Department of Health, Education and Welfare, Washington, D.C., 1973).

Lawyer's Committee for Civil Rights Under Law, A Study of State Legal Standards for the Provision of Public Education, prepared for the National Institute of Education (1974).

National Educational Association, Ranking of the States 1973 (National Educational Association, Washington, D.C., 1973).

Office of Education, Digest of Educational Statistics (Government Printing Office, Washington, D.C., 1962-).

Office of Education, The State of State Departments of Education, The Fourth Annual Report of the Advisory Council on State Departments of Education (Government Printing Office, Washington, D.C., 1969).

Paisley, W., et al., The Status of Educational Research and Development in the United States: 1975 DATABOOK (NIE, Washington, D.C.; prepublication version, May 1975).

Ratliff, S., ed., State Education Journal Index (Fort Collins, Colorado, 1963-).

Standard Education Almanac (Academic Media, Los Angeles, California, 1968-).

State Codes. The state code provides the text of state statutory law, which in policy analysis entails the state-level governance. The code, especially the annotated version, is often a good starting point for information gathering. It will either state the full set of state-level policies, agents, resources, and activities that are needed to begin policy analysis, or it will direct the researcher to the appropriate sources.

United States Code Annotated (West Publishing Co., St. Paul, Minnesota). This commercial publication reproduces the official United States Code, but annotates the statutes with digests of court decisions, citations to relevant administrative regulations, and a brief outline of each provision's legislative history.

United States Code, Congressional and Administrative News (West Publishing Co., St. Paul, Minnesota, 1941-). This publication collects the more important federal legislative history materials and binds them with the text of the enactment. Excerpts from hearings or committee reports of federal laws enacted since 1941 will often be found in this service.

U.S. Library of Congress, Monthly Checklist of State Publications, 56 Vols. (Government Printing Office, Washington, D.C., 1910-).

Wanger, J., Directory of Educational Information Resources (CCM Information Corporation, New York, New York, 1971).

Winchell, C. M., Guide to Reference Books, 8th ed. (American Library Association, Chicago, Illinois, 1967). This book is one of the most exhaustive collections of reference works. Completeness and organization make this the handbook of reference librarians.

Guides to the Use of Policy Information Sources

In this section we cite a variety of handbooks and guides in legal and reference research that explain techniques needed to use more fully the types of materials described in Section D of this bibliography.

Cohen, M., Legal Research in a Nutshell (West Publishing Co., St. Paul, Minnesota, 1968).

Doyle, J., "Searching Education Literature, A Brief Guide," Reference Quarterly, Vol. 11, No. 3 (Spring 1972).

Foskett, D. J., How to Find Out: Educational Research (Pergamon, Oxford, and New York, 1965).

Harvard Law Review Association, A Uniform System of Citation, 11th ed. (Harvard Law Review Association, Cambridge, Massachusetts, 1967).

Jacobstein, J. M., and R. M. Mersky, Legal Research Illustrated, 4th ed. (Foundation Press, Mineola, New York, 1973). This book, a comprehensive, clear guide to legal research, is an abridgment of Fundamentals of Legal Research by Erwin H. Pollack.

Katz, W. A., Introduction to Reference Work Volume II: Reference Services and Reference Processes, 2nd ed. (McGraw-Hill Book Co., New York, New York, 1974). This book is a basic text for serious students of reference research. It provides standard reference methods and sources to initiate the researcher to logical, comprehensive approaches to information gathering. The author provides extensive footnotes and lists of suggested readings to complement the material presented.

Price, M. O., and H. Bitner, Effective Legal Research: A Practical Manual of Law Books and Their Use, 3rd ed. (Little, Brown & Co., Boston, Massachusetts, 1969). Price and Bitner offer a thorough description of all the tools of the legal profession. The book is indispensable for its in-depth study of reference works and indexes that aid in finding U.S. law. Of particular interest are Chapters 5, "Legislative Histories" (pp. 56-73) and 6, "Federal Statutes: Index and Tables" (pp. 74-92).

Rezny, A. A., and M. K. Remmlein, A Schoolman in the Law Library (Interstate Printers and Publishing, Danville, Illinois, 1962).

Roalfe, W., ed., How to Find the Law, with Special Chapters on Legal Writing, 6th ed. (West Publishing Co., St. Paul, Minnesota, 1965).

Rombauer, M. D., Legal Problem Solving, Analysis, Research and Writing, 2nd ed. (West Publishing Co., St. Paul, Minnesota, 1973).

Todd, A., Finding Facts Fast: How to Find Out What You Want to Know Immediately (William Morrow & Co., New York, New York, 1972).

West Publishing Company, West's Law Finder, A Research Manual for Lawyers (West Publishing Co., St. Paul, Minnesota, 1967).

Legal Resources and Policy Archives: A Quick Reference Guide for Policy Analysts

One skill which policy research in education requires of the analyst is basic competency in legal reference work for both the general acquisition of policy information and the resolution of particular questions. This requires the understanding of definite techniques. Unfortunately, however, although these techniques are not difficult to acquire and employ, they are possessed by few educational researchers or policy analysts since legal reference work is usually taught only in law school. Therefore, the attached table is provided to give researchers unfamiliar with legal research a quick reference guide for use in the law library.

Table 1a

LEGAL RESOURCES AND POLICY ARCHIVES: A QUICK REFERENCE GUIDE FOR POLICY ANALYSTS

Reference Need	Source	Steps	Comments
I Entree to Formal Policies A. Descriptive word method B. Topic analysis method	Legal encyclopedias General - Corpus Juris Secundum (C.J.S) - American Jurisprudence (Am.Jur) - American Law Reports State A few states have legal encyclopedias. For each state in question, contact the reference desk at the law library. Legal digests Federal - Supreme Court Digest - Federal Digest State Legal digests are available for every state and the District of Columbia. Attorney general opinions Federal Opinions of the Attorneys General of the United States State For each state in question, contact the reference desk at that state's official law library. Legal periodicals Index to Legal Periodicals	A. Descriptive word method Make a list of words describing the problem in terms of the four Ws (who, where, what, why) plus any legal terms you think may be related to the problem. Look up these terms in reference sources Modify the word list to reflect the terms used by the sources (for example, if you look up "teacher" and the source refers you to "schools and school districts," change your word list accordingly. B. Topic analysis method Determine the general source of the policy needed (for example, case law, regulation, statute). Locate the block of material that houses the needed policy (e.g., United States Code, a court reporter, Code of Federal Regulations). Consult the tables of contents, starting at the most general level and moving to the specific area of interest (for example, code:title:chapter:section:subsection:specific provision).	
II Locating a Constitutional Provision	Federal and state constitutions are published at the beginning of the respective codes of statutory law.	Use the topic analysis method described in Row I, B, of this table.	
III Locating a Statute A. From a legal citation (for example, 20 U.S.C. 844) B. From the number of the enactment (e.g., PL 89-10) C. From a popular name (for example, Elementary and Secondary Education Act of 1965)	Federal - United States Code (U.S.C.) - United States Code Annotated (U.S.C.A.) - Federal Code Annotated (F.C.A.) State All states have codified statutes. For information on which states have annotated statutes, and whether cross-reference tables for enactment and statute numbers are available, contact the reference desk at each state's official law library.	A. From a citation (for example, 20 U.S.C. 884) Locate the correct code by the initials (for example, U.S.C. refers to United States Code; R.C.W. refers to the Revised Code of Washington). Locate proper volume by number preceding abbreviated name of code (for example, 20 U.S.C. 844 refers to Title 20). Locate the specific section by the number following the abbreviated code name (for example, 20 U.S.C. 844 refers to Section 844). If a pocket insert is included at the back back of the code book being used, or a supplement volume is provided at the end of the entire code, use the section number again to see if further information is given on the statute.	When researching statutes, always use an annotated code if one is available. The legal annotation provides extremely valuable information to the policy analyst (see Legal Research Illustrated by Jacobstein and Mersky for an explanation of the legal annotation and its use). Checking the pocket insert or supplementary volume, whichever is provided, is an integral part of this task. It gives information on any changes in the status of the statute subsequent to the publication of the code (for example, repeal or amendments from later law).

Table 14 (Continued)

Reference Need	Sources	Steps	Comments
III (Continued)		B. From the number of the enactment (for example, PL 89-10) Consult the margin notes if you have an annotated sliplaw, or consult Statutes at Large, which cross-references the legal code and public law citations. Follow steps outlined in A of this box. C. From a popular name (for example, Elementary and Secondary Act of 1965) Consult the Table of Popular Names (see Row V of this table), which cross-references the code and enactments by their popular names. Follow steps outlined in A of this Box.	A sliplaw is simply the pamphlet or single sheet that gives the text of an enactment promptly after its passage. If you are confused by a citation, consult A Uniform System of Citation (11th Edition), which is published by the Harvard Law Review Association.
IV Locating the Text of an Enactment from Which a Statute Is Derived	Federal Statutes at Large Sliplaw	Federal Locate the citation from the legal annotation contained in the codes, or consult Statutes at Large, which cross-references the legal code and public law citations. Obtain the text of the law from any federal depository library, filed in chronological order by number. State For each state in question, contact the state's official law library.	The tables in the Statutes at Large are arranged in chronological order, not by subject. There is a subject index, however, and tables to indicate how each law listed in the volume affects previous laws. Federal depository libraries are always not far away. By law, each Congressional district has at least one. For the policy analyst, these libraries are a valuable information resource since they house nearly all the publications of the Government Printing Office (all official federal publications). See the third comment in Row III of this table for an explanation of the Sliplaw.
V Knowledge of Popular Names of Enactments	Federal Shepard's Federal and State Acts and Cases by Popular Names United States Code Annotated--general index United States Code (1970 ed.)--general index State Shepard's Federal and State Acts and Cases by Popular Names	Check the opening paragraphs of the statute, if you have it. If a law is to be recorded by a popular name, one of the first provisions will read, "This law is to be known as...." OR Check the Shepard's Guide	The popular name of certain portions of the law carries much more meaning than its citation (for example, Freedom of Information Act, as opposed to PL 93-502). Do not overlook the index to the latest U.S.C. supplement if the name you are looking for is not in the other sources. The enactment may be a very recent one and not yet codified in the main code.
VI Locating Sources of Legislative History A. From legal citations B. When only the popular name of the enactment is known C. When only the public law enactment number is known D. For bills that did not or have not yet become law	Federal United States Code Annotated Congressional Record	Federal A. From legal citations Look up the citation in the annotated code. Consult the legislative history annotation given at the end of the section in question. These materials may be obtained as outlined in Row VII of this table.	The annotations in the U.S.C.A. contain references to the full legislative history on statutes. When using the code annotations, do not confuse the notes on the legislative evolution of the statute with the legislative history. Bills not enacted include both those pending in the legislature and those failing to be passed into law.

Table 15 (Continued)

Reference Need	Sources	Steps	Comments
VI (Continued)		B. When only the popular name of the enactment is known Consult the Table of Popular Names (see Row V of this table) and get the public law number. Follow the instructions for C in this Box. C. When only the public law number is known Consult the Daily Digest, which is in the Congressional Record (and compiled annually). Locate information about the legislative history by the PL number. OR Consult the legislative Cross-Reference table (see Row III, B, of this table) and obtain the citation of the statute in the code. Follow the steps outlined in A of this Box. D. For bills that did not or have not yet become law Locate the bill number from the subject index of the annual index of the Congressional Record. Still using the Congressional Record Annual Index, consult the History of Bills and Resolutions table for references to legislative history documents. Obtain the documents as outlined in Row IV of this table. State For each state in question, contact the reference desk at the state's official law library.	
VII Sources of Legislative History A. Finding the original text or revisions to the text of a bill B. Finding the transcripts of the hearings C. The committee reports D. Transcripts of floor debates E. Finding the original text of the enactment	Federal Official federal documents Congressional Record United States Code, Congressional and Administrative News	Federal A. Finding the original text or revisions to the text of a bill Obtain the number of the bill as indicated in Row III, A, of this table. Use that as the official document number to obtain the text from any federal depository library. B. Finding the transcripts of the hearings Obtain the number of the bill as indicated in Row III, A, of this table. Consult the U.S. Monthly Catalog of Government Publications (compiled annually), using bill number to determine if hearings were held and recorded. Obtain documents, if any, from a federal depository library.	See the second comment in Row IV of this table concerning federal depository libraries. For federal legislative history, the first place to look is always in the United States Code, Congressional and Administrative News. This publication collects the most important federal legislative history materials and binds them together with the text of the enactment.

Table 14 (Continued)

Reference Need	Sources	Steps	Comments
VII (Continued)		C. The committee reports Consult the United States Code, Congressional and Administrative News, using the public law number. D. Transcripts of floor debates Consult the History of Bills table in the Congressional Record, using the bill number for references. The debates are recorded in the Congressional Record's daily accounts of the proceedings of Congress. E. Finding the original text of the enactment See Row IV of this table. State Little formal legislative history is recorded by the states. For each state contact the legislative committee staff directly. To get the initial leads, state legislative history on a major bill can often be gleaned from newspaper accounts reporting the progress of the bill.	
VIII Locating Regulations A. From a reference in a legal annotation (for example, 43 U.S.C. 118) B. When legal annotations are unavailable	Federal Code of Federal Regulations	Federal A. From a reference in a legal annotation (for example, 43 U.S.C. 118) Locate the correct code by the abbreviation of the name (for example, C.F.R. means Code of Federal Regulations). Locate the proper volume by the number preceding the abbreviated code name (for example, 43 C.F.R. 118 means Volume 43). Locate the specific regulations by the number following the abbreviated code name (for example, 43 C.F.R. 118 means Section 118). Check in the Federal Register or in the Codification Guide to determine if any change has been made in the regulation in question. B. When legal annotations are unavailable Consult parallel tables in Title 2 of the C.F.R. to obtain cross-reference of enactment to regulations. Obtain the citations and follow steps listed in A of this box.	The C.F.R. parallel tables in Title 2 cross-reference the regulations to the enactments by public law number, statute number, or the popular name of the law.

Table 14 (continued)

Reference Need	Source	Steps	Comments
VIII (Continued)		State Not all states codify their administrative regulations. For each state, contact the agency in question directly to obtain their regulations.	
IX Locating Guidelines	Federal and state Policy archives of the agent implementing the law	Determine from a reading of the policy the agent responsible for its enforcement/implementation. Contact that agent directly and make information needs as specific as possible in the areas for which guidelines are desired.	Reading and interpreting the text of legislation is an arduous, time-consuming task. For precisely this reason, one of the important roles of the administrative agencies is writing guidelines that explain and clarify the intent of the law. Often these are put together in the form of handbooks. These can be an extremely valuable source of information to the police analyst. (Statutes and regulations have the force of law; guidelines, standing alone, do not.)
X Locating a Court Report A. From a citation (for example, Bowman v. Hamlett, 188 S.W. 1008, 139 Ky. 184) B. When only the name of the case is known (for example, Bowman v. Hamlett) C. When only the defendant's name is known.	Federal Supreme Court Reports: Supreme Court cases Federal Reporter: Cases heard in federal courts of appeals Federal Supplement: Selected cases heard in federal district courts Federal Rules Decisions: decisions, articles, speeches relating to federal rules of procedure State: National Reporter System Atlantic Reporter (A), or A and A.2d) (ME, VT, NH, CT, RI, DE, PA, MD) North Eastern Reporter (N.E. and N.E.2d) (MA, NY, OH, IN, IL) North Western Reporter (N.W. and N.W.2d) (WI, MI, MN, IA, ND, SD, NE) Southern Reporter (So. and So.2d) (AL, MS, LA, FL) South Western Reporter (S.W. and S.W.2d) (MO, AR, TN, KY, TX) Pacific Reporter (Pac or P and P.2d) (AK, AZ, CA, CO, HI, ID, KS, MT, NV, NM, OR, OK, UT, WA, WY) South Eastern Reporter (S.E. and S.E.2d) (WV, VA, NC, SC, GA) Also individual state reporters (e.g., Ky.)	A. From a citation (for example, Bowman v. Hamlett, 188 S.W. 1008, 139 Ky. 184) Locate the correct case reporter series by the initials (for example, 188 S.W. 1008 refers to the South Western Reporter). Locate the proper volume by the number preceding the initials (for example, 188 S.W. 1008 refers to Volume 188). Locate the case by the page number that is given following the initials (for example, 188 S.W. 1008 refers to page 1008). B. When only the name of the case is known (for example, Bowman v. Hamlett) Consult Shepard's Federal and State Acts by Popular Names to locate the citation. OR Consult the regional digests. Use the Table of Cases and Defendant-Plaintiff tables to find the citation. Follow the steps outlined in A of this Box. C. When only the defendant's name is known Consult the appropriate jurisdiction's court reporter or digest published by West's Publishing Co. Locate the citation from the lists in the Defendant-Plaintiff Table of Cases. Follow the steps outlined in A of this Box.	In the example given, the citation 139 Ky. 184 refers to the official Kentucky Case Reporter of that state. If at all possible, use the National Reporter System (published by West's Publishing Co.) for research requiring investigation of case law. The West's reporters usually provide for the cases a brief synopsis and "headnotes" for each case. A headnote is a short summation of the facts of the situation of the case and the rule of law applied by the court to those facts. A case will carry as many headnotes as there are points of law in the legal alterations therein. The National Reporter "Blueback" gives citations to the National Reporter System. The discussion of case law investigation outlined by this table encompasses only the use of the materials of West's Publishing Co. It is highly recommended that the researcher consult Legal Research Illustrated by Jacobstein and Mersky for a more comprehensive explanation of the use of available case law materials.

Table 15 (concluded)

Reference Need	Sources	Steps	Comments
5) Assessing the Case A. To determine if the points of law are relevant to your research B. To determine how the case has been treated in subsequent court decisions	National Reporter System case writeups (see Row 3 of this table) Shepard's Citations	A. Relevance of case to your research Locate the case report by the steps outlined in Row 3 of this table. Read the synopsis and headnotes to determine relevance of the case to your research. B. How the case has been treated in subsequent court decisions Consult the volume of Shepard's Citations that corresponds to the case reporter being used. Locate the information on how the case has been treated (for example, overruled by a higher court or cited by later cases), using the citation information.	See the first comment in Row 3 for a discussion of case headnotes. Shepardizing a case is not simply a nice finishing touch to getting information on a case, but an integral part of the information-gathering process for case law. The analyst should consider the last case decided on a particular point of law to be the common law on that issue. It is incorrect to lift a quote from a case to make a point if that case has been overturned by the courts or expanded by later cases that make the import of the quote no longer valid. The use of Shepard's Citations is not a straightforward task, without an explanation of the numbers and symbols. Therefore, we highly recommend that the researcher consult either Legal Research Illustrated by Jacobstein and Mersky, or How to Use Shepard's Citations, published by Shepard's Citations, Inc., to learn the proper use of this material. Although the technique is not difficult, it does not lend itself to explanation in a brief table such as the one at hand.

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Maruyama, M., "Paradigmatology and Its Application to Cross-Disciplinary, Cross-Professional and Cross-Cultural Communication," Department of Systems Sciences, Portland State University (1973).

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Sieber, S. D., "Federal Support for Research and Development in Education and Its Effects," in Uses of the Sociology of Education, C. W. Gordon, ed., Part II, The Seventy-third Yearbook of the National Society for the Study of Education (The University of Chicago Press, Chicago, Illinois, 1974).

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Appendix A

A BIBLIOGRAPHIC ESSAY OF GENERAL SYSTEMS THEORY AND KPU IN EDUCATION

Appendix A

A BIBLIOGRAPHIC ESSAY OF GENERAL SYSTEMS THEORY AND KPU IN EDUCATION

Our analytical framework requires an extremely broad conceptual foundation if it is to succeed in describing the complex structure of governance in KPU in education. Because general systems theory (GST), incomplete as it is, provides a basis for various theories of organizational behavior as well as criteria for analysis of systems at many different levels and of many different kinds, it is a prime candidate for the conceptual role. Cybernetics theory, as one of its most important subsets, deals quite fundamentally with issues of control, regulation, and "deciding"; it will play a major part in developing the first part of the framework.

The body of theory and methodology that makes up systems science has grown rapidly since pioneering work was done by von Bertalanffy, Weiner, von Neumann, Shannon, and others in the early 1940s. Most of its perceived usefulness has been in areas of technology design and analysis; in various approaches to models and simulation; and, less successfully, in planning and decision-making models for social and institutional systems. Its successes in this latter area have generally been limited by the complexity of the topics to which it has been applied.

In this appendix we present several overviews directed toward major applications, particularly in education, and a brief review of the main causes for success and failure.

While GST remains mostly a synthesis of attempts to demonstrate a set of laws for all kinds of systems,* its most successful applications have been somewhat limited. The major successes have been in the design and analysis of nonliving, technological systems--the artifacts of human invention. A. D. Hall (1962) describes in detail this methodology, called systems engineering, and suggests extensive applications for dealing with complex social systems. (There are now a number of softer systems engineering books available that present similar approaches without elegant mathematical trappings.) The power of systems engineering is clearly demonstrated by the rapid development and proliferation of computers and sophisticated military technology, and by a general trend toward the cybernation of mechanistic processes. Computers, in particular, have had a profound effect on institutional management and planning, as a budgeting aid, and on the nature of KPU research itself in education at all levels.

The general advent of high-speed computation automata has created a medium for designing complex mathematical models and simulating their behavior, over time and under a variety of conditions, without disturbing the actual system that is being modeled. Systems dynamics, a technique first used by Forrester (1961) in simulating industrial system processes, has proved useful as a methodology for examining change in systems where variables are quantifiable and the relationship between elements are usually higher-order difference equations; queuing theory and other event-dependent models have been applied to problems of human-machine interaction and scheduling in social systems (Gordon, 1969). Various specialized applications of both major modeling approaches have found their way into the education research and administration environment.

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*Deductive, as well as inductive, approaches to GST abound in the area's literature.

Systems analysis as a general planning tool is discussed from a number of perspectives by Ozbekhan (1969) and others. One often-used, but still controversial technique, the planning-programming-budgeting system (PPBS), is used in both private and public educational organizations. Critical path method (CPM or PERT) is often used for analysis of scheduling problems, in education research design, and in school operations as well as in the noneducation area (Immegart and Pilecki, 1973, p. 18). Many other techniques for dealing with "systemic" kinds of problems--from decision theory to gaming to information theory--are used in education, usually emulating their application elsewhere; we see no need to list all of these here.

The primary impact of systems theory in education (both KPU and non-KPU) has been in the area of administration and organizational behavior. A. Downs (1967) developed a theory of bureaus and bureaucratic behavior; many of the "laws" and hypotheses described in it are relevant to the analysis of KPU administrative organizations; these laws are also analogous to a group of GST hypotheses. Immegart and Pilecki (1973) provide a comprehensive overview of system theory and its relevance for education administrators. In an earlier study, Immegart (1969) develops four distinct, but interrelated, analytical frameworks for classifying education administrative behavior; these were quite helpful in developing our initial framework of the governance system. Churchill (1974) proposes and discusses a cybernetics-based KPU analytical framework that is also partially congruent with our approach. H. D. Gideonse (1968) discusses the staging of administrative events for managing education research and development; Schalock and Sell (1972) construct a systems framework for the analysis of research, development, diffusion, and evaluation in education (RDD&E--another label in vogue for KPU). Organizational behavior theories range along a continuum bounded on one side by rational decision-making models (Maxson and Sistrunk, 1973 is typical),

and on the other by more or less random decision models (Cohen, March and Olsen, 1972; Lindblom, 1959). A systems approach to the problem of describing how schools behave in a political environment is explored by Kirst and Wirt (1972) in an extension of Easton's (1965) work on political science in a systems context. Most, if not all, include some basic systems concepts in their analytical frameworks.

Development of comprehensive futures planning methodologies, based primarily in systems analysis, now attempts to account for systemic changes in the environment from which education theory, practice, and facility requirements evolve. One such study, undertaken by Project Simu School, incorporates a systems flow chart describing various impacts of societal change on learning theory and curriculum changes in developing a facilities planning model (Leu, Ford and Cornish, 1974).

Generally, attempts to deal with more complex (i.e., whole-system) or more substantive (e.g., curriculum reform) issues have not been as well received. The reasons for failure are many, but foremost is the incompleteness of various systems approaches. Misuses of systems hypotheses, misunderstanding and imprecise use of systems language (e.g., PPBs in this study), and especially promises of results considerably beyond the current state of the art (Hoos, 1974) contribute to dissatisfaction with the systems perspective.

Success is quite high in uses for conceptual theory building that often implicitly (or explicitly) uses certain subsets of existing systems theory. This usefulness is marked in preliminary research and planning steps: in definition and description of basic system elements and their attributes, in general discussion of interaction between a system and its environment, in pictorial representation of connections between elements (e.g., flows of money in KPU, information channels and networks, and the like), and in determining procedures for more detailed analysis. Models

and maps of the system--occasionally mathematical, but more often graphical--are the typical results from this sort of work. At such high levels of aggregation and complexity, however, model validation is often difficult and may fall short of expectations for reliability and predictability.

More focused applications of systems methodologies are more successful, particularly in areas of budgeting, personnel management, and narrowly defined technologies (e.g., audiovisual equipment design) because of the relative simplicity of these systems, the low number of variables considered, and the usually explicit and quantifiable objectives that such systems are designed to satisfy. Add to most of these efforts a complex of human variables, a soupcon of qualitative goals, or a requirement for great variety, and the problems concomitant with more holistic approaches reappear.

An unfortunate barrier to success lies within the general resistance toward the technique and the jargon of systems: analysts may provide relatively elegant, technically rigorous models for their clients; these models are more often than not incomprehensible and useless to policymakers who must weigh issues and make decisions in a highly volatile political marketplace. There are major communication problems, not unlike those between scientists of different specialties, between most major parties in systems-based social analysis.

Systems theory as an analytical method and predictive tool is currently limited. Nevertheless, it appears to have great value as a tool for insight into the complexity and multilevel problems and perspectives that are part of KPU.

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Appendix B

EDUCATIONAL KPU: WHAT KIND OF SYSTEM?

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EDUCATIONAL KPU: WHAT KIND OF SYSTEM?

Before a program can be built for monitoring social change, some kind of a model of the system to be monitored is necessary. NIE, in its 1973 position paper, "Building Capacity for Renewal and Reform," characterized conceptual problems and goals for such a monitoring effort:

- We have lacked the data base and the understanding of systems dynamics needed for effective, rational policy-making (p. 65).
- This program is intended to establish an internal NIE capability to monitor the external R&D system and the operating system in education (p. 67).
- [A] conference on alternative conceptualizations of the knowledge production and utilization system [will be held] as a first step towards a better understanding of the knowledge production and utilization process (p. 69).

While the question of what sort of system educational KPU might be is clearly open for inquiry, the sense that there is a KPU system is nevertheless pervasive. Describing the steps to build a monitoring program, NIE goes on to say:

> The concept of "monitoring" is borrowed from the literature on social indicators. That literature was originally focused largely on the identification and measurement of outcomes at a macroscopic level. More recently it is come to emphasize the need to conceptualize models of society or significant social subsystems and to use the models to identify the variables in all parts of the system. As they are concerned with the dynamic interaction between model elements and the measurement and understanding of change, the indicators must be time-series. Once the interrelationships in the model have been established empirically, monitoring change in the variables becomes a means of anticipating change in other

> parts of the system. As development of such a model is a very long-term goal, it must be approached through a process of successive approximations. Even so, a beginning must be made (pp. 67ff).*

The statement infers a KPU system that is highly interconnected and quite explicit, that is, relationships throughout the system can be clearly identified, and knowledge about them can lead to an effective monitoring program. However, several recent studies, including our own, suggest that such a position may be overly ambitious at the present time. Furthermore, there are presently a number of conflicting views or conceptualizations of an overall system for educational KPU; which perspective is adopted has important implications for an NIE-based monitoring program.

Mechanistic Versus Self-Organizing or Living Systems

How are we to choose a single perspective that best satisfies both the criteria of a "reconstructed logic" (an empirically-based model) and the requirements for monitoring? For the most part, we agree with Guba and Clark (1974) where they emphasize a "configurational perspective" and refute a systems view of educational KPU that is decidedly mechanistic. We found that analyses of configurations (based on satisfying particular analytical purposes) was far more profitable than describing or mapping all educational KPU governance for all reasons. We wish to note, however, that there are alternative formulations of systems that largely reject mechanistic or "machinelike" interpretations of human organization and behavior. Prominent among these are approaches to self-organizing (Ashby, in Buckley, 1968), living (Miller, 1965; Wallace, in draft), and adaptive (Bateson, in Von Foerster et. al., 1974) systems views.

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*See E. B. Sheldon and R. Parke, "Social Indicators," Science, Vol. 188, pp. 693-99 (16 May 1975) for a discussion of the state of the art in social indicator research.

Importantly, all of these emphasize interaction (between an agent and its environment) and, in Bateson's words, "coevolution." In our view, these alternative concepts are largely consistent with a configurational image of educational KPU.* Unfortunately their application to modeling large social systems is still somewhat beyond the state of the art; still they offer more realistic approaches to social dynamics than do mechanistic systems approaches.

In arguing against a [mechanistic] systems view of educational KPU, Guba and Clark characterize the present interpretation of KPU in education as an admittedly linear systems model; in Table B-1, we reconstruct the properties they assign to this perspective. Table B-2 is a summary list of properties of living systems versus those of mechanistic systems. When compared with Table B-1, Table B-2 indicates that Guba and Clark's criticisms deserve to be leveled at the mechanistic systems view and not at the systems view per se.

Implications for a Monitoring Program

The question, then, is not whether the systems view is capable of dealing with educational KPU in a realistic, comprehensive, and balanced way (as we believe it is); rather we must ask whether the type of systems view that could fulfill these requirements could also be used as an

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*We hope that in making the above contrasts no reader will infer that we disagree with Guba and Clark's essential conclusions regarding the utility of what they have termed the "configurational perspective." In fact, our analytical framework and findings agree with their characterization of the nature of educational KPU. We do, however, disagree with some of the inferences they draw, for example, that the proper NIE response to a constituency that is a "nonsystem" is to delegate much of its decision-making responsibility to that constituency.

Table 8-1

PROPERTIES OF THE CONFIGURATIONAL PERSPECTIVE AND THE SYSTEMS VIEW OF KPU ACCORDING TO GUBA AND CLARK'S (1974) ESSAY

The Systems View	The Configurational Perspective
The basic contention is that the KPU planner would be much closer to descriptive reality if he were to picture:	
1. A KPU system	1. An educational KPU community (pp. 29 ff)
Which can congruently be discussed using terminology such as:	
2. Allocation, authority, compulsion, delegation, assignment...	2. Political negotiation, persuasion, responsibility, and commitment (p. 30)
And which is true because the view assumes that:	
3. The functions of R&D are linear and can be linked, thereby forming: (a) a system of agencies and agents (b) with assigned functions and responsibilities in RDDA, (c) sharing goals, (d) and directed to productive output which would result in improvement oriented change in schools (p. 20)	3. Few hierarchical relationships with authority allocations exist among the agencies and agents of educational KPU (p. 30)
Thus:	
4. The root metaphor for system is...mechanical...it implies some sort of mechanism with a variety of parts moving together to achieve some common end. (p. 25)	4. The term "communitylike" is intended to identify the root metaphor undergirding the configurational model in the same sense that "machinelike" is the root metaphor for the systems view. (p. 29)

Table 8-2

MECHANISTIC VERSUS LIVING SYSTEMS PARADIGMS

Machinelike Systems Paradigm	Living Systems Paradigm
1. The system must be designed and built.	1. The system is evolved and grown in open-ended and indeterminate processes, with some "external" design assistance and direction.
2. It must be organized by its leaders and managers.	2. It is self-organizing and self-adaptive to an important degree.
3. The system is defined by its structure, functions, and boundaries. It can be thought of as free-standing, stable, and real.	3. The system is seen as fluid, dynamically stable, always changing in live interaction with its environment. It can be seen as a state of consciousness of its members and others.
4. It has a rigid and well-defined structure.	4. A changeable and changing structure exists, generated by and embodying past processes, and influencing present and future process possibilities.
5. Parts of the system can be analyzed and treated independently of each other and of the whole.	5. Everything interacts dynamically with everything else, and often in counterintuitive ways.
6. Things happen by chains of linear cause and effect.	6. Changes in state result from nonlinear and dynamically interactive effects of positive and negative feedback.
7. Relationships tend to be firm until they are consciously changed.	7. Relationships are always in a process of change, whether or not we are aware of them.
8. The system's behavior has little or no unintended side effects on its environment.	8. Great attention must be given to possible side effects, including second and third order.
9. Management is exercised mainly through command, direction, and authority, with emphasis on	9. Management is exercised mainly by responsibility, influence, expertise, creativity, and process design, with emphasis on
10. Formally defined decisions, rules, procedures, and roles.	10. Finding and pursuing goals, by initiating open-ended processes, development of a climate and ethic, role adaptation, and mutual learning.
11. The emphasis is on power and authority.	11. The emphasis is on the right information at the right place at the right time.
12. System hierarchy is seen as a rigid structure of power relationships.	12. Hierarchy is seen in terms of the emergence of qualitatively different functions at each level.
13. Control is though of as the key to managerial success.	13. Coordinated, contextual, responsible autonomy is the key to managerial success.
14. Planning is seen as a formalized decision-making discipline.	14. Planning is seen as a mutual learning and decision-resolving process.
15. Monitoring is seen as the collection of quantitative data that always reflect the same variables.	15. Monitoring is seen as the collection of data about variables that change as a result of particular concern and different context.

organizing basis for a monitoring program for NIE. The question cannot be answered simply:

- In general, a linear model of educational KPU (e.g., RDDA) is an inaccurate way of characterizing the entire enterprise. Social indicators selected on this basis to track change in education are in this sense misleading. There may be specific KPU institutions where certain processes are designed to be linear. Here, and only in a limited fashion, can indicators be used to monitor change. Particular care must be taken not to generalize such indicators as representative of the whole.
- Insofar as configurational analyses are performed to answer specific questions or address specific issues about educational KPU and/or educational KPU governance, we believe monitoring is feasible.
- Where empirically justified, configurational analyses may become more holistic, that is, larger configurations made up of significantly interacting smaller configurations with which the present study has dealt. Where such analysis is successful, only then can the feasibility of a comprehensive monitoring system be judged.

To state this another way: within the limits of a particular configuration, social indicator monitoring may be practical; neither theory nor data are as yet sufficient to prescribe general indicators of educational KPU conduct. Our own experience, as well as that of Guba and Clark and others doing similar systems analyses of educational KPU, does not affirm the notion of a tight-knit, logically interconnected, and linear educational KPU system. We do not believe that educational KPU, viewed as a whole, should as yet (if ever) be characterized as a "formal" system; nor should it be monitored as such. However, applying systems principles to mapping configurations is feasible, economical, and immediately practicable; it should be pursued as an organizing basis for a necessarily primitive monitoring program that addresses specific educational KPU concerns rather than general areas.

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